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RESEARCH MEMORANDUM

WIND-TUNNEL INVESTIGATION AT SUBSONIC AND SUPERSONIC SPEEDS OF A
MODEL OF A TAILLESS FIGHTER AIRPLANE EMPLOYING A LOW-ASPECT-
RATIO SWEPT-BACK WING - EFFECTS OF EXTERNAL FUEL TANKS
AND ROCKET PACKETS ON THE DRAG CHARACTERISTICS

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RESEARCH MEMORANDUM

WIND-TUNNEL INVESTIGATION AT SUBSONIC AND SUPERSONIC SPEEDS OF A
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AND ROCKET PACKETS ON THE DRAG CHARACTERISTICS

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SUMMARY

The effects of external fuel tanks and externally mounted rocket
packets on the drag characteristics of a model of a tailless fighter
airplane are presented in this report. The investigation was conducted
through a Mach number range of 0.60 to 0.90 and 1.20 to 1.70 at a constant
Reynolds number of 3.2 million. The measured lift, drag, pitching-moment,
and rolling-moment coefficients and lift-drag ratios are presented in
tabular form and the drag characteristics and lift-drag ratios are also
presented in graphic form. In addition, pressure distribution data are
tabulated which may be used to determine the influence of the external
stores on the wing load distribution at supersonic speeds.

Results of this investigation show that the addition of two external
fuel tanks and four faired rocket packets to the model produced drag
increments which increased from 30 percent to 50 percent of the drag of
the basic model between Mach numbers of 0.60 and 0.90, respectively,
while at supersonic Mach numbers this drag increment was approximately
30 percent of the drag of the basic model. Tests of the model fitted
with four rocket packets indicate that the drag may be reduced at sub-
sonic speeds by fairing the open rocket packets, but at supersonic speeds
the faired packets produced more drag. A small decrease in drag was
realized at supersonic speeds, for the model fitted with two fuel tanks
and four rocket packets, by mounting the outboard packets and fuel tanks
in a more forward chordwise position with respect to the wing.

INTRODUCTION

Knowledge of the increases in drag to be expected from the addition
of externally mounted fuel tanks and armament under the wings and fuselage
becomes increasingly important as the trend continues toward long-range,
high-speed fighter airplanes carrying rocket-propelled armament. An

investigation of the effects of this type of external installation on
the aerodynamic characteristics of a model having a low-aspect-ratio
swept-back wing has been conducted in the Ames 6- by 6-foot supersonic
wind tunnel. The model was fitted with various combinations of under-
the-wing type rocket-packet and fuel-tank installations and tested at
subsonic and supersonic Mach numbers at a constant Reynolds number. Two
chordwise locations of the fuel tanks and rocket packets were investigated
and the rocket packets were tested with the ends of the packets faired
smooth and with the rocket tubes open. The results of this investigation
are presented herein. The results of an investigation of the stability
and control characteristics of this same model conducted in the Ames
6- by 6-foot supersonic wind tunnel are presented in reference 1.

NOTATION

The lift, drag, and pitching-moment coefficients are referred to
the stability axes with the origin at the quarter-chord point of the
mean aerodynamic chord projected to the fuselage center line.
Rolling-moment coefficients are referred to the fuselage longitudinal
axis.

b wing span, feet

c local wing chord measured parallel to plane of symmetry, feet

$\bar{c}$ wing mean aerodynamic chord $\left(\dfrac{\int_0^{b/2} c^2 dy}{\int_0^{b/2} c \, dy} \right)$, feet

C_D drag coefficient $\left(\dfrac{drag}{qS} \right)$

C_{D_S} increment of drag coefficient due to external-store installation or fuselage modification based on total wing area $\left(C_{D_{model + store}} - C_{D_{model}} \right)$

C_L lift coefficient $\left(\dfrac{lift}{qS} \right)$

C_l rolling-moment coefficient $\left(\dfrac{rolling\ moment}{qSb} \right)$

C_m pitching-moment coefficient $\left(\dfrac{pitching\ moment}{qS\bar{c}} \right)$

C_p static pressure coefficient $\left(\dfrac{p-p_0}{q} \right)$

$\dfrac{L}{D}$ lift-drag ratio

$\left(\dfrac{L}{D}\right)_{max}$　maximum lift-drag ratio

M　free-stream Mach number

p　local static pressure, pounds per square foot

p_O　free-stream static pressure, pounds per square foot

q　free-stream dynamic pressure, pounds per square foot

R　Reynolds number, based on the mean aerodynamic chord

S　total projected wing area, including area formed by extending leading and trailing edges to plane of symmetry, square feet

Y　spanwise distance from plane of symmetry, feet

α　angle of attack of fuselage longitudinal axis, degrees

APPARATUS

Wind Tunnel and Equipment

The present investigation was conducted in the Ames 6- by 6-foot supersonic wind tunnel. This is a closed-return, variable-pressure wind tunnel in which the pressure and Mach number can be continuously varied. The stagnation pressure can be varied from 2 to 17 pounds per square inch absolute and the Mach number can be varied from 0.60 to 0.90 and from 1.15 to 2.00. A complete description of the wind tunnel is given in reference 2.

The model was sting mounted with the pitch plane of the model horizontal in the wind tunnel to utilize the most uniform stream conditions. (See reference 2). A four-component electrical strain-gage balance, similar in design to that used in reference 3, was enclosed within the fuselage of the model. The aerodynamic forces and moments were registered by recording-type galvanometers calibrated by applying known loads to the balance.

Model

A model of a high-speed fighter airplane having a low-aspect-ratio, swept-back wing and a swept-back vertical tail but not horizontal tail was used in this investigation (fig. 1). A bubble-type canopy was faired into a dorsal fin which extended back to the vertical tail. Provisions

were made for fairing the vertical tail into the fuselage when the canopy and dorsal fin were removed. The wing had a leading-edge sweep angle of 52.5° and a taper ratio of 0.332 based on the theoretical wing tip. The wing was composed of symmetrical sections in streamwise planes having a thickness of 7.0 percent of the chord at the wing root tapering to 4.5 percent of the chord at the theoretical wing tip.

The model was fitted with inlets housed in wing-body juncture fairings with internal ducts allowing the air to flow through and exhaust at the rear of the fuselage. In this investigation the mass flow of air through the ducts was not adjustable; however, the ducts were constructed so that at supersonic speeds the exit was choked, limiting the inlet Mach number to 0.4. In order to accommodate the annular duct exit and the mounting sting, the boattailing on the model was somewhat less than would be expected on a full-scale airplane.

Rocket packets and fuel tanks were provided, to be attached to the wings in the locations shown in figures 2 and 3. The outboard rocket packets and the fuel tanks were mounted on unswept and swept-forward pylons as shown in figures 2 and 3. The purpose of the swept-forward pylons was to obtain a more forward location of these stores. The rocket packets were tested both with the fore and aft ends of the rocket packet faired smooth and with six holes open through the packet, to simulate conditions before and after firing the rockets.

Provisions were made to measure pressure distribution data at five spanwise stations as shown in figure 4. The location of the orifices on the upper and lower surfaces of the port wing are given in table I.

TESTS AND PROCEDURE

As a basis for comparison, tests were made of the basic model with canopy and dorsal fin in place and with no external stores installed. Lift, drag, pitching-moment, and rolling-moment data were obtained at Mach numbers of 0.60, 0.80, 0.90, 1.20, 1.35, 1.50, and 1.70 at a constant Reynolds number of 3.2 million, through an angle of attack range of -2° to +8°. Similar data were then obtained at corresponding test conditions for the following model configurations:

1. Basic model fitted with inboard and outboard faired rocket
    packets mounted on unswept pylons

2. Basic model fitted with inboard and outboard open-tube rocket
    packets mounted on unswept pylons

3. Basic model fitted with two external fuel tanks mounted on
    unswept pylons

4. Basic model fitted with inboard and outboard faired rocket packets and two external fuel tanks all mounted on unswept pylons

5. Basic model fitted with outboard faired rocket packets and two external fuel tanks mounted on swept pylons and inboard faired rocket packets mounted on unswept pylons

6. Basic model with canopy and dorsal fin removed (no external stores)

Pressure distribution data were obtained for the basic model and for the model fitted with four faired rocket packets mounted on straight pylons. These tests were conducted at Mach numbers of 1.20, 1.30, and 1.70 at a Reynolds number of 2.0 million. Data were obtained through an angle-of-attack range of -3° to +12° at 2° increments for the basic model and 4° increments for tests of the model fitted with the rocket packets. A tabulation of the test conditions is presented in table II.

<center>Reduction of Data</center>

The test data have been reduced to standard NACA coefficient form based on the total projected wing area including the area in the region formed by extending the leading and trailing edges to the plane of symmetry (fig. 1). Factors which could affect the accuracy of these results and the corrections applied are discussed in the following paragraphs.

Angle of attack.- The determination of the actual angle of attack of the model under load required several corrections to be applied to the nominal angle. Corrections, determined from static load calibrations, were applied for the angular deflection of the sting and balance under aerodynamic load and for the angular movement due to structural clearance in the model support and balance. These corrections amounted to from 5 to 10 percent of the nominal angle, depending on the load.

Tunnel-wall interference.- Corrections to the data for the effects of the tunnel walls at subsonic speeds were made by the method of reference 4. These corrections which were added to the data were as follows:

$$\Delta\alpha = 0.377\ c_L$$

$$\Delta C_D = 0.0066\ c_L{}^2$$

The reflected bow wave did not intersect the model and so no tunnel-wall corrections were made for supersonic Mach numbers.

The effect of constriction of the flow at subsonic speeds due to the presence of the model was taken into account by the method of reference 5. This correction was calculated for conditons of zero angle of attack and was applied through the angle-of-attack range. At a Mach number of 0.90, this correction amounted to a 1-percent increase in Mach number and dynamic pressure over those values determined from calibrations of the wind tunnel without a model in place.

Support interference.- Results of a wind-tunnel test of a similar model (reference 6) show that the effects of support interference consisted primarily of a change of pressure at the base of the model. In this test the base pressure was measured and corrections were applied to adjust the pressure at the base to free-stream static pressure.[1] The drag values are, therefore, forebody drag coefficients.

Stream variations.- Tests were made at subsonic and supersonic speeds with the model in upright and inverted attitudes. Results of these tests showed no measurable indications of stream angle or stream curvature in the horizontal plane of the wind tunnel. Stream surveys of the Ames 6- by 6-foot supersonic wind tunnel (reference 2) show some curvature in the vertical plane of the wind tunnel, but the results of a subsequent investigation (reference 7) indicate that this curvature has little effect on the longitudinal aerodynamic characteristics of the model when pitched in the horizontal plane.

Internal duct drag.- The model was equipped with twin ducts through which air could flow. However, provisions were not made to vary the mass flow, so a study of the duct drag characteristics was not feasible in this investigation. The drag data presented herein are for the complete model; that is, the drag due to flow through the ducts has not been subtracted from the final drag coefficients.

Precision of Data

The accuracy of the test results, excluding stream effects, is shown by the repeatability of the data. Examination of the results showed the data to repeat with the accuracy shown in the following table:

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[1]The base area used in this investigation was the entire base area of the model less the duct exit area.

| | Accuracy | |
Quantity	$C_L = 0$	$C_L = 0.25$
C_D	±0.0004	±0.0006
C_L	±.0016	±.0018
C_m	±.0005	±.0005
C_l	±.0006	±.0009
C_p	±.005	±.005
M	±.03	±.03
R	±.03 × 10^6	±.03 × 10^6
α	±.1	±.15

The precision of the data presented herein is superior to that of
the data in reference 1 because these data were obtained for a consecutive
series of tests in the wind tunnel and the mounting of the model and
balance was unchanged during this investigation.

RESULTS AND DISCUSSION

Only the data pertinent to a study of the effects of external fuel
tanks and rocket packets on the drag characteristics of the model are
discussed in this report. All the force and moment data obtained from
these tests, including lift and rolling-moment coefficients and lift-
drag ratios, are presented in table III, however. In addition, experi-
mental static pressure coefficients obtained at Mach numbers of 1.20,
1.30, and 1.70 for the basic model and for the model fitted with four
rocket packets are presented in table IV. Comparison of the data from
these pressure distribution tests gives an indication of the effects of
the rocket-packet installation on the air loads experienced by the model.

The effects of external stores on the drag characteristics of the
model are presented in this report as the increments of drag coefficient
incurred by the addition of external stores. Figure 5 presents the vari-
ation of drag coefficient with lift coefficient for the basic model at
Mach numbers of 0.60, 0.80, 0.90, 1.20, 1.35, 1.50, and 1.70. As previ-
ously mentioned, the drag coefficients presented in this report include
the internal duct drag. The increments of drag coefficient for the vari-
ous store installations investigated are shown in figure 6 as a function
of Mach number for 0 and 0.25 lift coefficients. This figure shows that
at subsonic speeds the drag increment resulting from the addition of four
rocket packets was somewhat less when the packets were faired, but at
supersonic speeds fairing the packets increased the drag. The drag incre-
ments for two fuel tanks and four rocket packets, mounted in the aft
chordwise location (unswept pylons), varied from approximately 30 percent
of the drag of the basic model at a Mach number of 0.60 to 50 percent at

a Mach number of 0.90. For Mach numbers of 1.20 to 1.70 the drag incre-
ment for these same external-store configurations was approximately
30 percent of the drag of the basic model. Results of tests of the model
with the stores mounted in two chordwise locations showed that the change
in chordwise location had no significant effect on the drag at subsonic
speeds. At supersonic speeds, however, the drag increment resulting from
the addition of two fuel tanks and four rocket packets was somewhat
smaller for the forward chordwise location (swept pylons).

The maximum lift-drag ratios for all the configurations tested are
shown in figure 7 as a function of Mach number. These data are for the
unbalanced model.

Results of this investigation show that the addition of external
stores could appreciably affect the trim drag of the model. This effect
is illustrated in figure 8 which shows the variation of pitching-moment
coefficient with lift coefficient for the basic model and for the model
fitted with two external fuel tanks and four rocket packets. The magni-
tude of the pitching-moment coefficient at zero lift for the basic model
was quite small at all Mach numbers, but the model fitted with external
stores showed a significant negative pitching moment at subsonic speeds
and a positive pitching moment at supersonic speeds. These pitching
moments, associated with the installation of external stores on the model,
significantly influence the deflection of the longitudinal control sur-
face required for a specific flight condition. Thus it should be noted
that the drag coefficients presented for this investigation are for the
unbalanced model and that the total drag for the model balanced with a
control device will include an additional drag increment or decrement
due to the change in control setting required to counteract the aero-
dynamic influence of the external store. Pitching-moment characteristics
are shown for the model fitted with two fuel tanks and four rocket packets
because they exhibit the most pronounced effects of external stores of
all the configurations investigated.

CONCLUSIONS

The following conclusions are based on a wind-tunnel investigation
of the effects of external fuel tanks and externally mounted rocket
packets on the drag characteristics of a model of a tailless fighter
airplane:

1. The drag increase resulting from the addition of two external
fuel tanks and four faired rocket packets varied from 30 percent of the
drag of the basic model at 0.60 Mach number to 50 percent of the drag of
the basic model at 0.90 Mach number. At Mach numbers of 1.20 to 1.70,
this drag increment was approximately 30 percent of the drag of the basic
model.

2. The drag coefficient, at subsonic speeds, for the model fitted with four faired rocket packets was smaller than with four open rocket packets. At supersonic speeds the four faired packets produced greater drag increments than the open packets.

3. The drag coefficients for the model fitted with two fuel tanks and four faired rocket packets were somewhat less, at supersonic speeds, with the outboard rocket packets and fuel tanks in a forward chordwise location. At subsonic speeds the chordwise location caused no significant effect on the drag characteristics.

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TABLE III.- CONTINUED
(c) Tests 24 through 38

Test No.	α	c_L	c_D	c_m	c_l	L/D

TABLE III.— CONCLUDED

(d) Tests 39 through 43

Test No.	α	c_L	c_D	c_m	c_l	L/D
39						
40	-0.40	-0.025	0.0460	0.015	-0.0012	---
	-2.16	-.115	.0511	.035	-.0003	---
	-.57	-.020	.0454	-.006	-.0014	0.44
	1.11	.044	.0456	-.001	-.0014	.96
	2.20	.101	.0458	-.015	-.0015	2.12
	4.35	.219	.0581	-.039	-.0015	3.77
	6.49	.337	.0774	-.067	-.0009	4.36
	8.63	.445	.1048	-.093	0	4.24
41	-.39	-.018	.0457	.013	.0017	---
	-2.14	-.102	.0498	.030	-.0014	---
	-.57	-.024	.0454	-.004	-.0020	.53
	1.11	.044	.0478	-.011	-.0021	.96
	2.20	.099	.0476	-.016	-.0020	2.07
	4.33	.205	.0778	-.039	-.0018	3.25
	6.46	.309	.0732	-.065	-.0015	4.11
	8.58	.408	.1001	-.089	-.0011	4.08
42	-.39	-.080	.0462	.007	.0008	---
	-2.13	-.085	.0496	.024	-.0003	---
	-.75	-.020	.0460	0	-.0009	.44
	1.09	.043	.0482	-.005	-.0013	.93
	2.17	.090	.0460	-.016	-.0021	1.87
	4.28	.179	.0570	-.036	-.0015	3.14
	6.40	.268	.0719	-.058	-.0017	3.72
	8.51	.358	.0937	-.080	-.0018	3.82

Test No.	α	c_L	c_D	c_m	c_l	L/D
42	17.21	0.884	0.2433	-0.069	0.0007	3.39
	19.29	.875	.2984	-.076	-.0012	2.93
	21.33	.901	.3499	-.086	-.0005	2.59
43	-.56	-.024	.0110	-.003	-.0011	---
	-1.11	-.051	.0115	-.002	-.0012	---
	-3.32	-.163	.0166	-.004	-.0012	---
	-6.64	-.359	.0460	-.022	-.0015	1.82
	.53	-.020	.0110	-.005	.0011	4.51
	1.09	.051	.0113	-.006	.0011	8.38
	2.21	.108	.0130	-.045	.0005	10.90
	4.40	.223	.0205	-.017	-.0008	8.86
	6.61	.351	.0396	-.028	-.0010	6.72
	8.82	.486	.0723	-.045	-.0011	6.78
	11.00	.723	.1138	-.062	-.0023	5.21
	13.15	.876	.2038	-.069	-.0010	4.25
	15.26	.797	.2566	-.050	-.0011	3.62
	17.35	.797	.2566	-.076	.0008	3.10

Test No.	α	c_L	c_D	c_m	c_l	L/D
44	-.57	-.089	.0109	-.002	-.0013	---
	-1.14	-.098	.0134	.004	-.0013	---
	-3.39	-.189	.0185	.034	.0004	---
	-6.52	-.383	.0418	-.076	-.0001	1.51
	-.74	-.084	.0051	.004	-.0007	.60
	1.09	.053	.0743	-.004	.0004	1.51
	2.19	.113	.0490	-.009	.0007	3.01
	4.35	.238	.0376	-.020	-.0025	1.86
	6.51	.372	.0585	-.047	-.0020	4.91
	8.66	.499	.1017	-.077	.0010	5.29
45	10.81	.613	.1405	-.106	.0017	4.36
	12.96	.696	.1799	-.131	-.131	3.87

Test No.	α	c_L	c_D	c_m	c_l	L/D
46	-.54	-0.022	0.0355	0.003	-0.0009	---
	-1.09	-.051	.0363	.009	-.0006	---
	-3.25	-.162	.0412	.033	-.0002	---
	-6.47	-.340	.0718	.074	-.0002	0.48
	.52	-.017	.0352	-.004	-.0010	1.30
	1.08	.046	.0353	-.004	-.0011	2.73
	2.17	.102	.0374	-.022	-.0012	4.67
	4.31	.224	.0450	-.047	-.0008	4.46
47	6.45	.330	.0671	-.075	-.0006	---
	8.59	.442	.0946	-.102	---	---
	10.73	.541	.1648	-.127	-.0009	3.88
	12.86	.644	.1716	-.149	-.0013	3.75
47	-.54	-.019	.0346	.004	-.0008	.41
	-1.09	-.042	.0346	.006	-.0006	1.16
	-3.24	-.152	.0466	-.021	-.0019	2.50
	-6.44	-.310	.0689	-.045	-.0018	4.17
	.52	-.014	.0346	-.010	-.0006	1.87
	1.07	.040	.0344	-.006	-.0006	3.70
	2.16	.092	.0352	.088	-.0008	---
	4.28	.194	.0468	-.021	-.0019	---
	6.41	.298	.0466	-.045	-.0018	---
48	8.54	.397	.0683	-.070	-.0010	---
	10.66	.501	.1196	-.095	-.0012	---
	12.78	.590	.1568	-.118	-.0008	3.70
	2.13	.082	.0356	-.022	-.0008	1.01
	6.36	.172	.0602	-.043	-.0010	3.73
	8.47	.261	.0819	-.064	-.0012	4.25
	10.58	.348	.1089	-.085	-.0015	4.33
	12.69	.508	.1414	-.124	-.0017	3.39

TABLE IV.- EXPERIMENTAL PRESSURE COEFFICIENTS, C_p
(a) Basic model, M = 1.2

Orifice No.	\-3°	\-1°	0°	1°	2°	4°	6°	8°	10°	12°
0	1.354	1.377	1.386	1.388	1.399	1.384	1.392	1.390	1.376	1.352
1	---	---	---	---	---	---	---	---	---	---
2	.489	.438	.404	.381	.355	.296	.256	.207	.153	.116
3	.409	.358	.326	.303	.289	.280	.190	.147	.098	.067
4	.607	.556	.521	.507	.733	.440	.380	.305	.271	.228
5	.560	.520	.495	.476	.452	.403	.368	.334	.286	.264
6	.082	.062	.081	-.096	-.113	-.146	-.168	-.192	-.197	-.240
7	-.345	-.387	-.406	-.417	-.431	-.447	-.442	-.413	-.405	-.393
8	.108	.104	-.095	.103	.095	.082	-.069	-.057	-.051	-.074
9	.002	-.034	-.049	-.068	-.088	-.128	-.162	-.190	-.228	-.251
10	.059	.018	-.003	-.016	-.033	-.070	-.094	-.112	-.147	-.159
11	---	---	---	---	---	---	---	---	---	---
12	.109	.158	.181	.215	.248	.293	.361	.417	.469	.533
13	-.093	-.066	-.047	-.017	.002	.040	.097	.145	.187	.250
14	-.072	-.055	-.034	.015	.002	.036	.082	.123	.153	.205
15	.232	.239	.237	.245	.252	.256	.250	.270	.269	.264
16	.160	.056	-.037	-.008	.014	.058	.120	.180	.237	.251
17	.516	.480	.375	.299	.162	.177	.119	-.003	-.099	-.158
18	.008	-.083	-.136	-.183	-.222	-.301	-.361	-.444	-.522	-.571
19	---	---	---	---	---	---	---	---	---	---
20	-.114	-.178	-.209	-.239	-.268	-.332	-.388	-.452	-.514	-.577
21	.024	-.006	.017	-.061	-.085	-.131	-.167	-.207	-.261	-.368
22	.094	.044	.022	-.005	-.018	-.073	-.115	-.153	-.197	-.298
23	.069	.028	.001	.022	-.050	-.094	-.126	-.163	-.199	-.228
24	.053	.010	-.017	.038	-.058	-.096	-.130	-.165	-.205	-.289
25	.055	-.007	-.037	-.060	-.081	-.128	-.159	-.193	-.235	-.251
26	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---
28	-.264	-.313	-.325	-.330	-.344	-.366	-.323	-.245	-.204	.173
29	-.424	-.365	-.331	-.276	-.222	-.085	.065	.164	.305	.409
30	-.473	-.458	-.424	-.386	-.309	-.234	.088	.036	.155	.256
31	-.146	-.115	-.110	-.082	-.068	-.044	.005	.043	.087	.142
32	-.097	-.067	-.046	-.010	.005	.041	.087	.139	.194	.291
33	-.111	-.086	-.065	.060	-.009	.041	.113	.178	.233	.300

Orifice No.	\-3°	\-1°	0°	1°	2°	4°	6°	8°	10°	12°
34	-0.103	-0.078	-0.061	0.062	-0.005	0.041	0.109	0.165	0.222	0.295
34A	-.115	-.074	-.062	-.030	-.003	.058	.101	.164	.223	.290
35	-.126	-.104	-.085	-.053	-.032	.018	.074	.138	.187	.237
36	-.141	-.117	-.102	-.069	-.052	-.003	.045	.097	.135	.188
37	-.226	-.218	-.203	-.172	-.157	-.121	-.081	-.041	-.007	.038
38	-.318	-.351	-.353	-.340	-.333	-.304	-.277	-.251	-.227	-.185
39	.179	.030	-.052	-.194	-.218	-.358	-.470	-.584	-.678	-.737
40	.077	-.024	-.088	-.172	-.243	-.348	-.465	-.570	-.656	-.706
41	.046	-.032	-.083	-.126	-.175	-.331	-.446	-.545	-.624	-.673
42	.032	-.036	-.074	-.112	-.115	-.167	-.248	-.420	-.579	-.642
43	-.016	-.046	-.079	-.094	-.122	-.175	-.209	-.266	-.469	-.603
44	-.040	-.103	-.189	-.160	-.184	-.232	-.269	-.296	-.310	-.300
45	-.067	-.103	-.123	-.144	-.168	-.212	-.248	-.286	-.312	-.286
46	-.030	-.085	-.107	-.126	-.152	-.196	-.223	-.259	-.279	-.283
47	---	---	---	---	---	---	---	---	---	---
48	.029	-.081	-.111	-.124	-.139	-.166	-.204	-.240	-.275	-.198
49	-.239	-.137	-.054	-.010	.086	.191	.284	.372	.451	.522
50	---	---	---	---	---	---	---	---	---	---
51	---	---	---	---	---	---	---	---	---	---
52	-.222	-.161	-.118	-.072	-.040	-.030	.102	.182	.247	.324
53	-.160	-.137	-.116	-.079	-.054	.012	.079	.146	.209	.279
54	-.209	-.186	-.163	-.129	-.112	-.055	.003	.056	.094	.153
55	-.178	-.173	-.154	-.123	-.108	-.068	-.029	.009	.041	.085
56	---	---	---	---	---	---	---	---	---	---
57	-.052	-.126	-.138	-.121	-.109	-.083	-.045	-.010	.051	.075
58	-.164	-.177	-.168	-.149	-.141	-.102	-.071	-.033	.005	.050
59	.185	.056	-.026	-.124	-.227	-.389	-.522	-.631	-.716	-.747
60	.047	-.064	-.144	-.195	-.281	-.436	-.598	-.611	-.689	-.733
61	.027	-.068	-.119	-.174	-.226	-.358	-.507	-.606	-.679	-.723
62	.016	-.052	-.092	-.143	-.193	-.228	-.427	-.544	-.625	-.701
63	-.004	-.069	-.103	-.141	-.148	-.209	-.317	-.463	-.563	-.692
64	-.033	-.098	-.126	-.143	-.175	-.215	-.264	-.404	-.535	-.624
65	-.076	-.138	-.172	-.197	-.221	-.263	-.290	-.372	-.500	-.770
66	-.096	-.149	-.174	-.191	-.217	-.259	-.291	-.346	-.441	-.454

Orifice No.	\-3°	\-1°	0°	1°	2°	4°	6°	8°	10°	12°
67	---	---	---	---	---	---	---	---	---	---
68	-0.063	-0.131	-0.156	-0.164	-0.184	-0.222	-0.268	-0.320	-0.401	-0.451
69	.009	-.056	-.109	-.126	-.138	-.147	-.173	-.298	-.314	-.332
70	---	---	---	---	---	---	---	---	---	---
71	---	---	---	---	---	---	---	---	---	---
72	-.343	-.259	-.208	-.139	-.089	.015	.102	.185	.266	.347
73	-.304	-.200	-.145	-.094	-.055	.022	.096	.174	.245	.306
74	---	---	---	---	---	---	---	---	---	---
75	-.223	-.192	-.172	-.138	-.118	-.064	.001	.061	.107	.165
76	-.218	-.191	-.174	-.187	-.153	-.100	-.044	.013	.051	.104
77	-.216	-.208	-.193	-.176	-.170	-.127	-.064	-.020	.015	.059
78	-.169	-.158	-.137	-.116	-.097	-.037	.014	.051	.054	.103
79	-.201	-.186	-.152	-.154	-.135	-.090	-.032	-.017	.026	.079
80	-.166	-.175	-.152	-.158	-.140	-.116	-.088	-.051	-.018	.033
81	.224	-.032	-.028	-.130	-.243	-.448	-.583	-.679	-.728	-.736
82	.043	-.072	-.155	-.245	-.316	-.466	-.582	-.665	-.710	-.729
83	-.005	-.086	-.142	-.194	-.276	-.438	-.578	-.666	-.718	-.709
84	.001	-.056	-.103	-.155	-.214	-.377	-.499	-.589	-.688	-.649
85	-.018	-.071	-.103	-.132	-.156	-.207	-.323	-.437	-.535	-.592
86	-.087	-.149	-.182	-.191	-.211	-.244	-.278	-.366	-.458	-.526
87	-.167	-.226	-.256	-.285	-.250	-.326	-.374	-.401	-.508	-.542
88	-.175	-.204	-.219	-.236	-.250	-.284	-.312	-.321	-.439	-.486
89	-.086	-.169	-.199	-.222	-.240	-.256	-.237	-.336	-.408	-.478
90	-.428	-.234	-.113	-.002	-.032	.170	.328	.399	.448	.481
91	-.461	-.321	-.228	-.160	-.089	.024	.124	.214	.286	.355
92	-.394	-.294	-.218	-.144	-.051	.005	.085	.169	.230	.293
93	-.333	-.234	-.166	-.103	-.079	-.007	.086	.172	.222	.279
94	-.188	-.177	-.158	-.118	-.103	-.060	-.003	.044	.088	.135
95	-.242	-.244	-.231	-.219	-.196	-.168	-.108	-.060	-.020	.023
96	-.260	-.245	-.235	-.216	-.217	-.165	-.105	-.045	-.017	.011
97	-.223	-.217	-.216	-.206	-.203	-.147	-.106	-.073	-.037	.031
98	-.182	-.205	-.209	-.205	-.193	-.146	-.114	-.079	-.040	.003

TABLE IV.- CONTINUED
(b) Basic model, M = 1.3

Orifice No.	Angle of attack									
	-3°	-1°	0°	1°	2°	4°	6°	8°	10°	12°
0	1.438	1.437	1.442	1.449	1.463	1.459	1.454	1.445	1.432	1.411
1	---	---	---	---	---	---	---	---	---	---
2	.583	.470	.433	.411	.389	.336	.891	.944	.808	.156
3	.438	.396	.353	.322	.310	.262	.219	.176	.140	.099
4	.662	.550	.526	.485	.459	.397	.346	.296	.253	.209
5	.599	.554	.520	.498	.479	.440	.396	.351	.315	.275
6	.047	.021	-.008	-.027	-.058	-.063	.098	-.124	-.145	-.171
7	-.287	-.303	-.325	-.318	-.333	-.359	-.388	-.395	-.382	-.362
8	-.004	.037	.055	.065	.075	.072	.074	.065	.062	.059
9	.072	.050	.027	.012	.008	-.019	-.033	-.048	-.065	-.091
10	.064	.042	.015	.002	-.007	-.042	-.068	-.092	-.117	-.146
11	---	---	---	---	---	---	---	---	---	---
12	.157	.188	.215	.248	.280	.332	.039	.436	.497	.552
13	-.044	-.029	-.011	.011	.038	.089	.115	.156	.208	.258
14	-.044	-.089	.013	.006	.024	.049	.093	.132	.170	.212
15	.240	.235	.231	.232	.243	.243	.252	.256	.259	.262
16	-.068	-.055	-.039	-.020	.004	.040	.088	.134	.190	.243
17	.602	.594	.463	.411	.367	.302	.239	.147	.075	.002
18	.076	.010	-.037	-.087	-.119	-.176	-.240	-.300	-.360	-.407
19	---	---	---	---	---	---	---	---	---	---
20	-.127	-.161	-.194	-.223	-.243	-.290	-.339	-.390	-.435	-.473
21	-.049	-.087	-.126	-.143	-.163	-.209	-.246	-.286	-.331	-.387
22	.085	.029	.021	-.004	-.023	-.061	-.096	-.130	-.160	-.197
23	.029	.005	.001	-.025	-.040	-.077	-.111	-.143	-.171	-.206
24	.054	.021	-.005	-.025	-.043	-.073	-.109	-.141	-.169	-.203
25	.029	0	-.033	-.053	-.068	-.107	-.138	-.171	-.201	-.229
26	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---
28	-.262	-.280	-.296	-.309	-.317	-.340	-.359	-.379	-.394	-.412
29	-.305	-.281	-.240	-.201	-.141	-.034	.134	.181	.373	.420
30	-.386	-.393	-.379	-.355	-.319	-.257	-.151	-.045	.107	.183
31	-.139	-.189	-.094	-.070	-.053	-.030	.019	.098	.137	.144
32	-.078	-.069	-.053	-.029	-.001	.026	.065	.111	.188	.215
33	-.109	-.089	-.065	-.041	-.012	.024	.078	.130	.209	.252

Orifice No.	Angle of attack									
	-3°	-1°	0°	1°	2°	4°	6°	8°	10°	12°
34	-0.104	-0.091	-0.068	-0.046	-0.021	0.030	0.072	0.126	0.200	0.248
34A	-.084	-.059	-.032	-.011	-.014	.036	.102	.164	.217	.277
35	-.119	-.077	-.087	-.066	-.038	0	.049	.096	.153	.203
36	-.144	-.131	-.110	-.088	-.060	-.030	-.017	.066	.113	.169
37	-.226	-.215	-.206	-.182	-.160	-.126	-.082	-.043	.001	.039
38	-.337	-.335	-.331	-.320	-.299	-.267	-.257	-.225	-.190	-.155
39	.141	.076	.001	-.074	-.128	-.230	-.322	-.403	-.469	-.533
40	.035	-.027	-.124	-.154	-.209	-.294	-.371	-.436	-.498	-.543
41	.031	-.008	-.039	-.107	-.159	-.260	-.350	-.421	-.478	-.536
42	.029	-.006	-.056	-.084	-.094	-.147	-.234	-.313	-.413	-.484
43	.007	-.023	-.054	-.080	-.101	-.140	-.184	-.260	-.336	-.416
44	-.060	-.089	-.114	-.141	-.160	-.196	-.227	-.264	-.297	-.367
45	-.080	-.100	-.123	-.141	-.160	-.192	-.225	-.260	-.276	-.277
46	-.048	-.073	-.103	-.129	-.142	-.181	-.206	-.234	-.248	-.256
47	---	---	---	---	---	---	---	---	---	---
48	-.074	-.080	-.102	-.126	-.138	-.169	-.202	-.231	-.253	-.255
49	-.243	-.163	-.080	-.005	.076	.164	.257	.335	.411	.475
50	---	---	---	---	---	---	---	---	---	---
51	---	---	---	---	---	---	---	---	---	---
52	-.200	-.171	-.135	-.095	-.057	-.001	.066	.139	.216	.283
53	-.162	-.150	-.126	-.093	-.061	.006	.055	.114	.178	.235
54	-.197	-.182	-.160	-.134	-.104	-.066	-.017	.012	.087	.143
55	-.193	-.180	-.163	-.139	-.114	-.064	-.037	.007	.052	.091
56	---	---	---	---	---	---	---	---	---	---
57	-.154	-.161	-.151	-.140	-.126	-.101	-.068	.029	.017	.057
58	-.193	-.193	-.181	-.163	-.139	-.111	-.067	-.033	-.014	.054
59	.192	.097	.010	-.071	-.139	-.241	-.343	-.438	-.495	-.553
60	.042	-.015	-.104	-.183	-.243	-.333	-.410	-.477	-.531	-.579
61	.023	-.030	-.086	-.139	-.192	-.288	-.371	-.438	-.474	-.547
62	.019	-.028	-.072	-.123	-.178	-.290	-.378	-.443	-.502	-.532
63	.001	-.036	-.076	-.102	-.119	-.165	-.286	-.380	-.441	-.436
64	-.030	-.087	-.097	-.119	-.138	-.171	-.216	-.307	-.382	-.440
65	-.094	-.116	-.142	-.170	-.179	-.215	-.246	-.310	-.380	-.443
66	-.107	-.135	-.158	-.178	-.193	-.218	-.251	-.298	-.348	-.404

Orifice No	Angle of attack									
	-3°	-1°	0	1°	2°	4°	6°	8°	10°	12°
67	---	---	---	---	---	---	---	---	---	---
68	-0.098	-0.129	-0.151	-0.163	-0.178	-0.207	-0.236	-0.286	-0.346	-0.415
69	-.072	-.092	-.111	-.131	-.146	-.178	-.199	-.234	-.277	-.298
70	---	---	---	---	---	---	---	---	---	---
71	---	---	---	---	---	---	---	---	---	---
72	-.289	-.250	-.198	-.150	-.101	-.023	.068	.156	.233	.310
73	-.259	-.217	-.160	-.109	-.068	.001	.075	.156	.219	.286
74	---	---	---	---	---	---	---	---	---	---
75	-.201	-.193	-.170	-.138	-.112	-.067	-.011	.055	.103	.166
76	-.210	-.193	-.174	-.156	-.137	-.100	-.047	.019	.066	.120
77	-.216	-.203	-.188	-.172	-.156	-.129	-.076	.015	.025	.068
78	-.175	-.154	-.157	-.127	-.108	-.063	-.012	.035	.063	.100
79	-.207	-.190	-.178	-.164	-.140	-.108	-.055	.009	.027	.070
80	-.210	-.196	-.183	-.167	-.148	-.115	-.077	-.039	-.005	.038
81	.220	.135	.030	-.065	-.143	-.272	-.378	-.477	-.526	-.576
82	.041	.031	-.100	-.189	-.257	-.341	-.424	-.481	-.541	-.582
83	-.002	-.054	-.117	-.192	-.269	-.360	-.439	-.504	-.558	-.585
84	.005	-.033	-.083	-.131	-.190	-.301	-.381	-.456	-.283	-.558
85	-.011	-.037	-.078	-.114	-.143	-.235	-.331	-.406	-.472	-.513
86	-.068	-.109	-.136	-.155	-.177	-.209	-.260	-.389	-.389	-.470
87	-.178	-.197	-.221	-.242	-.257	-.283	-.312	-.343	-.386	-.446
88	-.177	-.193	-.207	-.213	-.225	-.244	-.273	-.290	-.328	-.358
89	-.158	-.170	-.079	-.209	-.224	-.241	-.243	-.134	-.261	-.339
90	-.311	-.199	-.086	.013	.087	.186	.287	.367	.427	.479
91	-.362	-.296	-.210	-.148	-.091	-.009	.090	.179	.249	.330
92	-.388	-.351	-.258	-.192	-.127	-.033	.099	.144	.212	.283
93	-.297	-.258	-.202	-.139	-.091	-.023	.060	.143	.204	.275
94	-.234	-.217	-.186	-.147	-.112	-.076	.024	.035	.063	.139
95	-.255	-.241	-.222	-.203	-.184	-.158	-.114	-.058	-.019	.030
96	-.261	-.245	-.225	-.207	-.188	-.162	-.114	-.055	.003	.037
97	-.226	-.213	-.204	-.195	-.183	-.156	-.110	-.067	-.027	.080
98	-.229	-.212	-.203	-.192	-.186	-.162	-.118	-.075	-.035	.008

NACA

TABLE III.- CONTINUED

(c) Tests 24 through 38

Test No.	a	c_L	c_D	c_m	c_l	L/D
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
34						
35						
36						
37						
38						

TABLE III.— CONCLUDED

(d) Tests 39 through 43

Test No.	α	c_L	c_D	c_m	c_l	L/D
39						

Test No.	α	c_L	c_D	c_m	c_l	L/D
42						
43						

Test No.	α	c_L	c_D	c_m	c_l	L/D
46						
47						
48						

TABLE IV.- EXPERIMENTAL PRESSURE COEFFICIENTS, C_p
(a) Basic model, M = 1.2

Orifice No.	_3°	-1°	0°	1°	2°	4°	6°	8°	10°	12°
0	1.354	1.377	1.386	1.388	1.399	1.384	1.392	1.390	1.376	1.352
1	-	-	-	-	-	-	-	-	-	-
2	.489	.438	.404	.381	.355	.296	.256	.207	.153	.116
3	.409	.358	.326	.303	.289	.280	.190	.147	.098	.067
4	.607	.556	.521	.507	.733	.440	.380	.305	.271	.228
5	.560	.520	.495	.476	.452	.403	.368	.334	.286	.264
6	.082	.062	.081	-.096	-.113	-.146	-.168	-.192	.197	-.240
7	-.345	-.387	-.406	-.417	-.431	-.447	-.442	-.415	-.405	-.393
8	.108	.104	-.095	.103	.095	.082	-.069	-.057	-.051	-.074
9	.002	-.034	-.049	-.068	-.088	-.126	-.162	-.190	-.228	-.251
10	.059	.018	-.003	-.016	-.035	-.070	-.094	-.112	-.147	-.159
11	-	-	-	-	-	-	-	-	-	-
12	.109	.158	.181	.215	.248	.293	.361	.417	.469	.533
13	-.093	-.066	-.047	-.017	.002	.040	.097	.145	.187	.250
14	-.072	-.055	-.034	.015	.008	.036	.082	.123	.153	.205
15	.232	.239	.237	.245	.252	.256	.260	.270	.269	.264
16	.160	.056	-.037	-.008	.014	.058	.120	.180	.237	.251
17	.516	.420	.357	.299	.162	.177	.119	-.003	-.099	-.158
18	.008	-.083	-.136	-.183	-.222	-.301	-.361	-.444	-.522	-.571
19	-	-	-	-	-	-	-	-	-	-
20	-.114	-.178	-.209	-.239	-.268	-.332	-.388	-.452	-.514	-.577
21	.024	-.006	.017	-.061	-.085	-.131	-.167	-.207	-.261	-.368
22	.094	.044	.022	-.005	-.018	-.073	-.115	-.153	-.197	-.228
23	.069	.028	.001	-.022	-.050	-.094	-.126	-.163	-.199	-.228
24	.053	.010	-.017	-.038	-.058	-.096	-.130	-.165	-.205	-.229
25	.055	-.007	-.037	-.060	-.081	-.128	-.159	-.193	-.235	-.251
26	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-
28	-.264	-.313	-.325	-.330	-.344	-.366	-.323	-.245	-.214	-.173
29	-.424	-.365	-.331	-.276	-.222	-.085	.065	.164	.305	.409
30	-.473	-.458	-.424	-.386	-.309	-.234	.088	.036	.155	.256
31	-.146	-.115	-.110	-.082	-.068	-.044	.005	-.043	.087	.142
32	-.097	-.067	-.046	-.010	.005	.041	.087	.139	.194	.251
33	-.111	-.086	-.065	.060	-.009	.041	.113	.178	.233	.300

Orifice No.	_3°	-1°	0°	1°	2°	4°	6°	8°	10°	12°
34	-0.103	-0.078	-0.061	0.062	-0.005	0.041	0.109	0.165	0.222	0.295
34A	-.115	-.074	-.062	-.030	-.003	.058	.101	.164	.223	.290
35	-.126	-.104	-.085	-.053	-.038	.018	.074	.138	.187	.237
36	-.141	-.117	-.102	-.069	-.052	-.003	.045	.097	.135	.188
37	-.226	-.218	-.203	-.172	-.157	-.121	-.081	-.041	-.007	.038
38	-.318	-.351	-.353	-.340	-.333	-.304	-.277	-.231	-.227	-.183
39	-.179	.030	-.032	-.124	-.218	-.358	-.470	-.584	-.678	-.737
40	-.077	-.024	-.088	-.172	-.243	-.348	-.465	-.570	-.656	-.706
41	.046	-.032	-.083	-.126	-.175	-.331	-.446	-.545	-.624	-.673
42	.032	-.036	-.074	-.112	-.115	-.167	-.248	-.420	-.579	-.642
43	-.016	-.046	-.079	-.094	-.192	-.175	-.209	-.266	-.469	-.603
44	-.040	-.103	-.189	-.160	-.184	-.232	-.269	-.296	-.310	-.300
45	-.067	-.103	-.123	-.144	-.168	-.212	-.248	-.286	-.312	-.286
46	-.030	-.085	-.107	-.126	-.152	-.196	-.223	-.259	-.279	-.283
47	-	-	-	-	-	-	-	-	-	-
48	.029	-.081	-.111	-.124	-.139	-.166	-.204	-.240	-.275	-.198
49	-.239	-.137	-.054	-.010	.086	.191	.284	.372	.451	.522
50	-	-	-	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-	-	-	-
52	-.222	-.161	-.118	-.072	-.040	-.030	.102	.182	.247	.324
53	-.160	-.137	-.116	-.079	-.054	.012	.079	.146	.209	.279
54	-.209	-.186	-.163	-.129	-.112	-.055	.003	.056	.094	.153
55	-.178	-.173	-.154	-.123	-.108	-.068	-.029	.009	.041	.085
56	-	-	-	-	-	-	-	-	-	-
57	-.052	-.186	-.138	-.121	-.109	-.083	-.045	-.010	.051	.075
58	-.164	-.177	-.168	-.149	-.141	-.102	-.071	-.033	.005	.050
59	-.185	.056	-.026	-.124	-.227	-.389	-.522	-.631	-.716	-.747
60	-.047	-.064	-.144	-.195	-.281	-.436	-.598	-.611	-.689	-.733
61	.027	-.068	-.119	-.174	-.226	-.358	-.507	-.606	-.679	-.723
62	.016	-.052	-.092	-.143	-.193	-.228	-.427	-.544	-.625	-.701
63	-.004	-.069	-.103	-.141	-.148	-.209	-.317	-.463	-.563	-.692
64	-.033	-.098	-.126	-.143	-.175	-.215	-.264	-.404	-.535	-.624
65	-.076	-.138	-.172	-.197	-.221	-.263	-.290	-.372	-.500	-.770
66	-.096	-.149	-.174	-.191	-.217	-.259	-.281	-.346	-.441	-.454

Orifice No.	_3°	-1°	0°	1°	2°	4°	6°	8°	10°	12°
67	-	-	-	-	-	-	-	-	-	-
68	-0.063	-0.131	-0.156	-0.164	-0.184	-0.222	-0.262	-0.320	-0.401	-0.451
69	.009	-.056	-.109	-.126	-.138	-.147	-.173	-.298	-.314	-.332
70	-	-	-	-	-	-	-	-	-	-
71	-	-	-	-	-	-	-	-	-	-
72	-.343	-.259	-.208	-.139	-.089	.015	.102	.185	.266	.347
73	-.304	-.200	-.145	-.094	-.055	.022	.096	.174	.245	.306
74	-	-	-	-	-	-	-	-	-	-
75	-.223	-.192	-.172	-.138	-.118	-.064	.001	.061	.107	.165
76	-.218	-.191	-.174	-.187	-.153	-.100	-.044	.013	.051	.104
77	-.216	-.208	-.193	-.176	-.170	-.127	-.064	-.020	.015	.059
78	-.169	-.158	-.137	-.116	-.097	-.037	.014	.051	.054	.103
79	-.201	-.186	-.152	-.154	-.135	-.090	-.032	-.017	.026	.079
80	-.166	-.175	-.152	-.158	-.140	-.116	-.088	-.051	-.018	.033
81	.224	-.032	.028	-.130	-.243	-.448	-.583	-.679	-.728	-.736
82	.043	-.072	-.155	-.245	-.316	-.466	-.582	-.665	-.710	-.729
83	-.005	-.086	-.142	-.194	-.276	-.438	-.572	-.666	-.718	-.709
84	.001	-.056	-.103	-.153	-.214	-.357	-.499	-.569	-.622	-.649
85	-.018	-.071	-.103	-.132	-.156	-.207	-.323	-.437	-.535	-.592
86	-.087	-.149	-.182	-.191	-.211	-.244	-.276	-.366	-.458	-.526
87	-.167	-.228	-.266	-.285	-.251	-.336	-.374	-.401	-.508	-.742
88	-.175	-.204	-.219	-.236	-.251	-.284	-.312	-.321	-.439	-.486
89	-.086	-.169	-.199	-.222	-.240	-.256	-.237	-.336	-.408	-.478
90	-.428	-.234	-.113	-.002	-.032	.170	.328	.399	.448	.481
91	-.461	-.321	-.228	-.160	-.089	.024	.124	.214	.286	.355
92	-.394	-.294	-.218	-.144	-.051	.005	.085	.169	.230	.293
93	-.333	-.234	-.166	-.105	-.079	-.007	.086	.172	.222	.279
94	-.188	-.177	-.158	-.118	-.103	-.060	-.003	.044	.088	.135
95	-.242	-.244	-.231	-.219	-.196	-.168	-.108	-.060	-.020	.023
96	-.260	-.245	-.235	-.216	-.217	-.165	-.105	-.045	-.017	.011
97	-.223	-.217	-.216	-.206	-.203	-.147	-.106	-.073	-.037	.031
98	-.182	-.205	-.209	-.205	-.193	-.146	-.114	-.079	-.040	.003

NACA

TABLE IV.- CONTINUED
(b) Basic model, M = 1.3

Orifice No.	-3°	-1°	0°	1°	2°	4°	6°	8°	10°	12°
0	1.438	1.437	1.442	1.449	1.463	1.459	1.454	1.445	1.432	1.411
1	---	---	---	---	---	---	---	---	---	---
2	.583	.470	.433	.411	.389	.336	.891	.944	.808	.156
3	.438	.396	.353	.322	.310	.262	.219	.176	.140	.099
4	.662	.530	.526	.485	.459	.397	.346	.296	.253	.209
5	.599	.554	.520	.498	.479	.440	.396	.351	.315	.275
6	.047	.021	-.008	-.027	-.098	-.063	.098	-.124	-.145	-.171
7	-.287	-.303	-.325	-.318	-.333	-.359	-.388	-.395	-.382	-.362
8	-.004	.037	.055	.065	.075	.072	.074	.065	.062	.059
9	.072	.070	.027	.012	.008	-.019	-.033	-.048	-.065	-.091
10	.064	.042	.015	.002	-.007	-.042	-.068	-.092	-.117	-.146
11	---	---	---	---	---	---	---	---	---	---
12	.157	.188	.215	.248	.280	.332	.039	.436	.497	.552
13	-.044	-.029	-.011	.011	.038	.069	.115	.156	.208	.258
14	-.044	-.029	-.013	.006	.024	.049	.093	.132	.170	.212
15	.240	.235	.231	.232	.243	.243	.232	.256	.259	.262
16	-.068	-.055	-.039	-.020	.004	.040	.088	.134	.190	.243
17	.602	.534	.463	.411	.367	.302	.239	.147	.075	.002
18	.076	.010	-.037	-.087	-.119	-.176	-.240	-.300	-.360	-.407
19	---	---	---	---	---	---	---	---	---	---
20	-.187	-.161	-.194	-.223	-.243	-.290	-.339	-.390	-.435	-.473
21	-.049	-.087	-.126	-.143	-.163	-.209	-.246	-.286	-.331	-.387
22	.085	.058	.021	-.001	-.023	-.061	-.096	-.130	-.160	-.197
23	.029	.005	.001	-.025	-.040	-.077	-.111	-.143	-.171	-.206
24	.054	.021	-.005	-.025	-.043	-.075	-.109	-.141	-.169	-.203
25	.029	0	-.033	-.053	-.068	-.107	-.138	-.171	-.201	-.229
26	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---
28	-.262	-.280	-.296	-.309	-.317	-.340	-.359	-.379	-.394	-.412
29	-.305	-.281	-.240	-.201	-.141	-.034	.134	.181	.373	.420
30	-.386	-.393	-.379	-.355	-.319	-.237	-.151	-.045	.107	.183
31	-.139	-.129	-.094	-.070	-.053	-.030	.019	.098	.137	.144
32	-.078	-.069	-.053	-.029	-.001	.026	.065	.111	.188	.215
33	-.109	-.089	-.065	-.041	-.012	.024	.078	.130	.209	.252

Orifice No.	-3°	-1°	0°	1°	2°	4°	6°	8°	10°	12°
34	-0.104	-0.091	-0.068	-0.046	-0.021	0.020	0.072	0.126	0.200	0.248
34A	-.084	-.059	-.032	-.011	-.014	.036	.102	.164	.217	.277
35	-.119	-.077	-.087	-.066	-.038	0	.049	.096	.153	.203
36	-.144	-.131	-.110	-.088	-.060	-.030	-.017	.066	.113	.169
37	-.226	-.215	-.206	-.182	-.160	-.126	-.082	-.043	.001	.039
38	-.337	-.335	-.331	-.330	-.299	-.267	-.257	-.225	-.190	-.155
39	.141	.076	.001	-.074	-.128	-.230	-.322	-.403	-.469	-.535
40	.035	-.027	-.124	-.154	-.209	-.294	-.371	-.438	-.498	-.543
41	.031	-.006	-.039	-.107	-.159	-.260	-.350	-.421	-.478	-.536
42	.029	-.006	-.036	-.084	-.094	-.147	-.234	-.313	-.413	-.484
43	.007	-.023	-.054	-.080	-.101	-.140	-.184	-.260	-.336	-.416
44	-.060	-.089	-.114	-.141	-.160	-.196	-.227	-.264	-.397	-.367
45	-.080	-.100	-.123	-.141	-.160	-.192	-.225	-.260	-.376	-.277
46	-.048	-.073	-.103	-.129	-.142	-.181	-.206	-.234	-.248	-.276
47	---	---	---	---	---	---	---	---	---	---
48	-.054	-.080	-.102	-.126	-.138	-.169	-.202	-.231	-.233	-.255
49	-.245	-.163	-.080	-.005	.076	.164	.257	.335	.414	.475
50	---	---	---	---	---	---	---	---	---	---
51	---	---	---	---	---	---	---	---	---	---
52	-.200	-.171	-.135	-.095	-.057	-.001	.066	.139	.216	.283
53	-.162	-.150	-.126	-.093	-.061	-.006	.055	.114	.178	.235
54	-.197	-.182	-.160	-.134	-.104	-.066	-.017	.032	.087	.143
55	-.193	-.180	-.163	-.139	-.114	-.084	-.037	.007	.052	.091
56	---	---	---	---	---	---	---	---	---	---
57	-.154	-.161	-.152	-.140	-.126	-.101	-.068	.029	.017	.057
58	-.193	-.193	-.181	-.163	-.139	-.111	-.067	-.033	-.014	.054
59	.192	.097	.010	-.071	-.139	-.241	-.343	-.438	-.495	-.553
60	.042	-.015	-.104	-.183	-.243	-.333	-.410	-.477	-.531	-.579
61	.023	-.030	-.086	-.139	-.193	-.288	-.371	-.436	-.474	-.547
62	.019	-.028	-.073	-.123	-.178	-.290	-.378	-.443	-.502	-.562
63	.001	-.036	-.076	-.102	-.119	-.165	-.226	-.280	-.341	-.426
64	-.030	-.087	-.097	-.119	-.136	-.175	-.216	-.307	-.362	-.440
65	-.094	-.116	-.142	-.170	-.175	-.215	-.246	-.310	-.380	-.443
66	-.107	-.135	-.158	-.178	-.193	-.218	-.251	-.296	-.348	-.404

Orifice No.	-3°	-1°	0	1°	2°	4°	6°	8°	10°	12°
67	---	---	---	---	---	---	---	---	---	---
68	-0.098	-0.129	-0.151	-0.163	-0.178	-0.207	-0.236	-0.286	-0.346	-0.415
69	-.072	-.092	-.111	-.131	-.146	-.178	-.199	-.234	-.277	-.298
70	---	---	---	---	---	---	---	---	---	---
71	---	---	---	---	---	---	---	---	---	---
72	-.289	-.250	-.198	-.150	-.101	-.023	.068	.156	.233	.310
73	-.259	-.217	-.160	-.109	-.068	.001	.079	.156	.219	.286
74	---	---	---	---	---	---	---	---	---	---
75	-.201	-.193	-.170	-.138	-.112	-.067	-.011	.055	.103	.166
76	-.210	-.193	-.174	-.156	-.137	-.100	-.047	.019	.066	.120
77	-.216	-.203	-.188	-.172	-.156	-.129	-.076	-.015	.025	.068
78	-.175	-.154	-.137	-.127	-.102	-.063	-.012	.035	.063	.100
79	-.207	-.190	-.178	-.164	-.140	-.102	-.055	-.009	.027	.070
80	-.210	-.196	-.183	-.167	-.148	-.115	-.077	-.039	-.005	.038
81	.220	.135	.030	-.065	-.143	-.272	-.378	-.477	-.526	-.576
82	.041	.031	-.100	-.189	-.257	-.341	-.464	-.481	-.541	-.582
83	-.002	-.054	-.117	-.192	-.269	-.360	-.439	-.504	-.558	-.585
84	.005	-.033	-.083	-.133	-.190	-.301	-.381	-.456	-.503	-.558
85	-.011	-.037	-.078	-.114	-.143	-.235	-.331	-.406	-.472	-.513
86	-.068	-.109	-.136	-.155	-.177	-.209	-.260	-.385	-.389	-.470
87	-.178	-.197	-.221	-.248	-.257	-.283	-.312	-.343	-.386	-.446
88	-.177	-.193	-.207	-.213	-.285	-.244	-.273	-.390	-.328	-.358
89	-.158	-.170	-.079	-.209	-.234	-.241	-.243	-.134	-.261	-.339
90	-.311	-.199	-.086	.013	.087	.186	.287	.367	.427	.479
91	-.367	-.296	-.210	-.148	-.091	-.009	.090	.179	.249	.330
92	-.388	-.351	-.258	-.192	-.127	-.033	.059	.144	.212	.283
93	-.297	-.258	-.202	-.139	-.091	-.023	.060	.143	.204	.273
94	-.234	-.217	-.186	-.147	-.112	-.076	.024	.035	.063	.139
95	-.255	-.241	-.222	-.203	-.181	-.158	-.114	-.058	-.019	.030
96	-.261	-.245	-.225	-.207	-.188	-.162	-.114	-.053	.003	.037
97	-.226	-.213	-.204	-.195	-.183	-.156	-.110	-.065	-.027	.080
98	-.229	-.212	-.203	-.193	-.186	-.162	-.118	-.075	-.035	.008

TABLE IV.- CONTINUED
(c) Basic model, M = 1.7

Orifice No	-3°	-1°	0°	1°	2°	4°	6°	8°	10°	12°
0	1.561	1.587	1.598	1.571	1.595	1.601	1.588	1.575	1.557	1.543
1	-	-	-	-	-	-	-	-	-	-
2	.507	.457	.439	.405	.376	.334	.291	.246	.207	.167
3	.419	.379	.356	.324	.302	.264	.224	.188	.152	.115
4	.489	.436	.417	.380	.356	.322	.277	.243	.203	.167
5	.631	.581	.561	.521	.500	.466	.415	.365	.322	.281
6	.190	.156	.144	.118	.097	.079	.040	.010	-.018	-.041
7	-.124	-.150	-.162	-.175	-.189	-.197	-.219	-.230	-.245	-.249
8	-.080	-.065	-.099	-.113	-.131	-.103	-.051	-.025	-.003	.008
9	.053	.026	.039	.044	.046	.049	.051	.053	.035	.023
10	.055	.030	.037	.033	.024	.016	-.010	-.026	-.058	-.087
11	-	-	-	-	-	-	-	-	-	-
12	.207	.380	.263	.289	.307	.361	.414	.520	.522	.576
13	.013	.028	.047	.068	.076	.116	.158	.196	.240	.283
14	-.005	.007	.020	.038	.050	.079	.118	.149	.187	.226
15	.195	.179	.176	.166	.161	.165	.169	.168	.175	.188
16	-.019	-.016	-.005	.020	.029	.063	.112	.148	.194	.240
17	.725	.661	.638	.599	.595	.512	.407	.389	.322	.222
18	.198	.144	.120	.101	.086	.046	-.041	-.075	-.103	-.149
19	-	-	-	-	-	-	-	-	-	-
20	-.073	-.113	-.126	-.148	-.172	-.196	-.219	-.241	-.266	-.288
21	-.036	-.071	-.085	-.108	-.131	-.158	-.190	-.217	-.246	-.273
22	.069	.037	.030	.016	.004	-.019	-.045	-.072	-.102	-.148
23	.053	.021	.038	.008	-.027	-.039	-.065	-.088	-.109	-.131
24	.054	.024	.008	-.003	-.022	-.034	-.057	-.078	-.104	-.124
25	.045	.008	.001	-.015	-.029	-.043	-.069	-.092	-.115	-.140
26	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-
28	-.123	-.146	-.151	-.161	-.176	-.185	-.203	-.217	-.234	-.254
29	-.037	.002	.048	.124	.160	.250	.318	.379	.550	.647
30	-.128	-.160	-.129	-.097	-.076	-.087	.055	.111	.234	.324
31	-.171	-.156	-.129	-.085	-.060	-.013	.042	.085	.122	.166
32	-.046	-.039	-.021	-.005	.004	.033	.075	.109	.150	.196
33	-.048	-.032	-.019	.009	.025	.061	.112	.154	.197	.248
34	-.056	-.041	-.030	-.008	.005	.054	.099	.140	.180	.243
34A	-.071	-.054	-.043	-.005	.001	.048	.097	.141	.181	.235

Orifice No	-3°	-1°	0°	1°	2°	4°	6°	8°	10°	12°
35	-0.063	-0.056	-0.034	-0.012	0.006	0.046	0.097	0.136	0.176	0.224
36	-.081	-.070	-.051	-.024	-.015	.034	.075	.112	.152	.204
37	-.136	-.127	-.115	-.095	-.072	-.044	-.006	.029	.071	.114
38	-.198	-.197	-.191	-.177	-.165	-.150	-.119	-.095	-.067	-.035
39	.178	.110	.090	.050	.016	-.031	-.091	-.147	-.202	-.252
40	.040	-.011	-.032	-.068	-.100	-.135	-.181	-.218	-.255	-.297
41	-.011	-.064	-.093	-.120	-.146	-.179	-.224	-.261	-.290	-.317
42	.023	-.036	-.067	-.110	-.142	-.181	-.227	-.266	-.304	-.337
43	.042	.009	-.001	-.051	-.143	-.146	-.158	-.248	-.282	-.316
44	-.026	-.054	-.067	-.080	-.090	-.114	-.137	-.164	-.234	-.302
45	-.028	-.062	-.068	-.090	-.108	-.122	-.147	-.170	-.186	-.261
46	-.026	-.051	-.064	-.079	-.088	-.113	-.134	-.152	-.173	-.219
47	-	-	-	-	-	-	-	-	-	-
48	-.018	-.048	-.062	-.078	-.096	-.114	-.138	-.156	-.171	-.192
49	-.060	-.034	.004	.059	.098	.195	.295	.366	.441	.513
50	-	-	-	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-	-	-	-
52	-.150	-.114	-.074	-.036	-.018	.035	.103	.157	.219	.263
53	-.083	-.083	-.066	-.037	-.019	.035	.097	.137	.185	.244
54	-.127	-.113	-.095	-.072	-.058	-.013	.043	.082	.129	.179
55	-.123	-.112	-.096	-.073	-.059	-.021	.024	.065	.109	.153
56	-	-	-	-	-	-	-	-	-	-
57	-.049	-.070	-.071	-.059	-.056	-.031	.006	.041	.080	.128
58	-.123	-.121	-.109	-.085	-.073	-.044	.003	.040	.075	.121
59	.221	.157	.126	.085	.045	-.021	-.091	-.161	-.221	-.264
60	.060	.005	-.018	-.057	-.088	-.130	-.184	-.230	-.276	-.312
61	-.011	-.057	-.086	-.113	-.140	-.179	-.220	-.259	-.293	-.321
62	.005	-.058	-.096	-.128	-.152	-.196	-.235	-.269	-.294	-.322
63	.020	-.040	-.073	-.116	-.145	-.188	-.239	-.278	-.296	-.341
64	.019	-.020	-.041	-.094	-.134	-.178	-.224	-.267	-.301	-.326
65	-.035	-.071	-.075	-.095	-.120	-.177	-.225	-.262	-.293	-.318
66	-.052	-.086	-.094	-.112	-.118	-.168	-.217	-.244	-.276	-.300
67	-	-	-	-	-	-	-	-	-	-
68	-.057	-.096	-.103	-.119	-.126	-.169	-.222	-.233	-.251	-.282
69	-.024	-.054	-.080	-.097	-.113	-.135	-.158	-.176	-.205	-.232
70	-	-	-	-	-	-	-	-	-	-

Orifice No	-3°	-1°	0°	1°	2°	4°	6°	8°	10°	12°
71	-	-	-	-	-	-	-	-	-	-
72	-0.187	-0.158	-0.131	-0.071	-0.041	0.023	0.100	0.168	0.241	0.349
73	-.174	-.141	-.108	-.051	.020	.045	.111	.171	.236	.304
74	-	-	-	-	-	-	-	-	-	-
75	-.157	-.126	-.106	-.073	-.055	-.016	.048	.091	.144	.199
76	-.128	-.124	-.115	-.085	-.072	-.036	.019	.069	.113	.166
77	-.141	-.132	-.132	-.109	-.097	-.062	-.003	.036	.087	.140
78	-.109	-.107	-.102	-.077	-.056	-.017	.036	.071	.112	.158
79	-.142	-.140	-.137	-.110	-.098	-.070	-.021	.018	.060	.108
80	-.149	-.145	-.134	-.111	-.099	-.071	-.027	.008	.052	.089
81	.278	.203	.160	.119	.066	-.021	-.120	-.191	-.251	-.308
82	.074	.019	-.013	-.047	-.082	-.135	-.196	-.241	-.285	-.330
83	.010	-.041	-.076	-.098	-.132	-.175	-.143	-.274	-.313	-.351
84	0	-.055	-.091	-.111	-.150	-.193	-.260	-.314	-.352	
85	.017	-.052	-.092	-.118	-.148	-.187	-.142	-.258	-.270	-.325
86	.005	-.044	-.083	-.133	-.174	-.220	-.162	-.287	-.316	-.347
87	-.065	-.097	-.115	-.139	-.184	-.231	-.172	-.313	-.340	-.364
88	-.089	-.110	-.123	-.135	-.173	-.227	-.170	-.305	-.334	-.356
89	-.094	-.111	-.121	-.129	-.154	-.209	-.163	-.289	-.298	-.301
90	-.042	.018	.058	.137	.185	.263	.206	.410	.476	.532
91	-.136	-.111	-.068	-.014	.014	.091	.091	.223	.267	.356
92	-.184	-.146	-.123	-.070	-.043	.020	.057	.173	.242	.309
93	-.185	-.163	-.124	-.074	-.039	.019	.056	.172	.235	.299
94	-.141	-.140	-.129	-.081	-.054	-.017	.027	.111	.166	.226
95	-.187	-.165	-.151	-.112	-.096	-.068	-.022	.012	.056	.091
96	-.193	-.173	-.166	-.118	-.088	-.068	-.029	.015	.059	.117
97	-.185	-.164	-.155	-.130	-.119	-.091	-.033	.004	.036	.084
98	-.174	-.163	-.156	-.132	-.120	-.094	-.041	-.019	.044	.067

NACA

TABLE IV.- CONTINUED
(d) Model with rocket packets, M = 1.2

Orifice No.	Angle of attack					Orifice No.	Angle of attack					Orifice No.	Angle of attack				
	-3°	0°	4°	8°	12°		-3°	0°	4°	8°	12°		-3°	0°	4°	8°	12°
0	1.360	1.375	1.384	1.371	1.384	34	----	----	----	----	----	67	----	----	----	----	----
1	----	----	----	----	----	34A	-.014	.082	.176	.299	.363	68	-.083	-.166	-.246	-.365	-.504
2	.485	.395	.287	.193	.107	35	-.103	-.048	.042	.133	.194	69	-.055	-.151	-.207	-.316	-.407
3	.401	.310	.218	.132	.057	36	-.230	-.164	-.042	.033	.168	70	----	----	----	----	----
4	.608	.569	.436	.307	.212	37	-.248	-.175	-.095	-.019	.032	71	----	----	----	----	----
5	.552	.477	.398	.320	.253	38	-.356	-.333	-.276	-.220	-.198	72	-.368	-.255	-.046	.170	.247
6	-.034	-.094	-.154	-.204	-.250	39	.159	-.123	-.497	-.704	-.745	73	-.347	-.221	-.128	.050	.334
7	-.379	-.426	-.441	.408	-.418	40	.012	-.189	-.506	-.690	-.729	74	----	----	----	----	----
8	.106	.091	.081	.051	.055	41	.033	-.122	-.430	-.644	-.702	75	-.210	-.121	-.008	.091	.149
9	----	----	----	----	----	42	.030	-.094	-.212	-.560	-.673	76	-.201	-.133	-.037	.042	.107
10	.049	-.013	-.080	-.126	-.174	43	-.016	-.112	-.222	-.382	-.646	77	-.163	-.152	-.073	.004	.068
11	----	----	----	----	----	44	-.064	-.155	-.255	-.310	-.333	78	-.173	-.115	-.034	.043	.086
12	.114	.193	.309	.424	.530	45	-.085	-.151	-.227	-.289	-.305	79	-.185	-.151	-.079	-.012	.065
13	-.060	-.036	.060	.157	.245	46	-.059	-.134	-.213	-.267	-.306	80	-.134	-.149	-.113	-.044	.101
14	-.073	-.030	.047	.134	.201	47	----	----	----	----	----	81	.162	-.146	-.577	-.726	-.727
15	.226	.234	.256	.263	.271	48	-.018	-.138	-.194	-.254	-.287	82	.003	-.252	-.576	-.704	-.720
16	.003	.059	.174	.271	.308	49	-.117	.065	.268	.384	.517	83	-.038	-.220	-.557	-.692	-.709
17	.505	.328	.153	-.031	-.162	50	----	----	----	----	----	84	-.025	-.170	-.458	-.619	-.682
18	.013	-.153	-.345	-.474	-.575	51	----	----	----	----	----	85	-.040	-.144	-.304	-.527	-.644
19	----	----	----	----	----	52	-.307	-.209	-.058	.164	.299	86	-.110	-.210	-.296	-.445	-.579
20	-.141	-.250	-.381	-.496	-.593	53	-.367	-.243	-.020	.116	.167	87	-.207	-.301	-.373	-.445	-.562
21	.034	-.060	-.135	-.227	-.397	54	-.177	-.108	0	.085	.158	88	-.167	-.244	-.297	-.337	-.511
22	.082	.007	-.080	-.167	-.247	55	-.173	-.126	-.049	.015	.071	89	-.109	-.209	-.244	-.276	-.493
23	.058	-.016	-.108	-.182	-.256	56	----	----	----	----	----	90	-.297	-.060	.212	.387	.476
24	.044	-.034	-.108	-.183	-.250	57	-.157	-.103	-.029	.033	.050	91	-.363	-.166	.011	.186	.351
25	.051	-.035	-.125	-.203	-.265	58	-.185	-.157	-.083	-.005	.052	92	-.365	-.247	-.049	.203	.310
26	----	----	----	----	----	59	.129	-.168	-.610	-.753	-.753	93	-.351	-.213	.007	.206	.275
27	----	----	----	----	----	60	.002	-.246	-.577	-.715	-.752	94	-.251	-.110	.056	.135	.169
28	-.305	-.337	-.336	-.220	-.239	61	-.019	-.210	-.558	-.701	-.729	95	-.251	-.201	-.123	-.041	.017
29	-.400	-.285	-.045	.183	.408	62	-.027	-.143	-.287	-.653	-.708	96	-.252	-.188	-.131	-.051	.004
30	-.394	-.270	-.063	.133	.217	63	-.030	-.139	-.272	-.581	-.668	97	-.202	-.169	-.129	-.050	.025
31	-.155	-.087	-.012	.096	.244	64	-.061	-.157	-.271	-.518	-.642	98	-.147	-.166	-.146	-.067	.002
32	.224	.244	.290	.326	.357	65	-.105	-.203	-.313	-.475	-.635						
33	-.343	-.285	-.134	.039	.087	66	-.131	-.197	-.301	-.417	-.560						

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TABLE IV.- CONTINUED
(e) Model with rocket packets, M = 1.3

Orifice No.	Angle of attack					Orifice No.	Angle of attack					Orifice No.	Angle of attack				
	-3°	0°	4°	8°	12°		-3°	0°	4°	8°	12°		-3°	0°	4°	8°	12°
0	1.417	1.442	1.440	1.426	1.407	34	----	----	----	----	----	67	----	----	----	----	----
1	----	----	----	----	----	34A	.047	.012	.124	.245	.395	68	-.099	-.139	-.210	-.262	-.414
2	.508	.431	.321	.228	.151	35	-.093	-.046	.041	.134	.236	69	-.060	-.115	-.175	-.226	-.315
3	.419	.346	.247	.163	.083	36	-.209	-.162	-.075	.026	.135	70	----	----	----	----	----
4	.640	.522	.377	.278	.205	37	-.258	-.220	-.128	-.030	.047	71	----	----	----	----	----
5	.585	.518	.417	.337	.266	38	-.320	-.309	-.269	-.222	-.156	72	-.310	-.226	-.092	.146	.268
6	.040	-.012	-.053	-.128	-.176	39	.128	-.023	-.255	-.434	-.551	73	-.325	-.233	-.084	.003	.209
7	-.293	-.334	-.378	-.396	-.371	40	.043	-.105	-.303	-.453	-.550	74	----	----	----	----	----
8	-.020	.057	.065	.081	.055	41	-.011	-.061	-.267	-.444	-.544	75	-.226	-.141	-.040	.082	.178
9	----	----	----	----	----	42	-.008	-.054	-.154	-.355	-.507	76	-.210	-.155	-.065	.038	.125
10	.054	.009	-.050	-.101	-.155	43	.003	-.065	-.155	-.296	-.431	77	-.209	-.171	-.084	.015	.089
11	----	----	----	----	----	44	-.068	-.127	-.204	-.273	-.381	78	-.176	-.124	-.043	.051	.123
12	.143	.226	.325	.445	.561	45	-.084	-.126	-.200	-.265	-.277	79	-.195	-.156	-.075	-.003	.054
13	-.055	-.004	.066	.158	.265	46	-.050	-.107	-.182	-.235	-.256	80	-.194	-.162	-.092	-.035	.024
14	-.055	-.011	.052	.132	.225	47	----	----	----	----	----	81	.180	-.034	-.285	-.453	-.565
15	.220	.231	.232	.252	.267	48	-.062	-.106	-.172	-.238	-.268	82	-.024	-.136	-.348	-.485	-.567
16	-.046	-.009	.085	.231	.348	49	-.226	.023	.209	.358	.446	83	-.016	-.141	-.358	-.500	-.578
17	.580	.450	.288	.125	-.027	50	----	----	----	----	----	84	.004	-.098	-.315	-.466	-.562
18	.060	-.054	-.192	-.315	-.419	51	----	----	----	----	----	85	-.012	-.086	-.246	-.425	-.524
19	----	----	----	----	----	52	-.274	-.172	-.025	.085	.292	86	-.085	-.138	-.208	-.350	-.464
20	-.139	-.218	-.312	-.409	-.487	53	-.324	-.299	-.170	.053	.183	87	-.174	-.228	-.282	-.358	-.464
21	-.027	-.089	-.196	-.291	-.397	54	-.175	-.115	-.036	.072	.170	88	-.173	-.209	-.229	-.298	-.415
22	.071	.018	-.065	-.137	-.202	55	-.177	-.136	-.064	.021	.095	89	-.140	-.191	-.223	-.238	-.390
23	.054	.005	-.082	-.150	-.209	56	----	----	----	----	----	90	-.227	-.045	.174	.357	.465
24	.041	-.005	-.082	-.150	-.207	57	-.126	-.131	-.087	-.015	.061	91	-.311	-.192	-.013	.154	.300
25	.026	-.020	-.096	-.163	-.219	58	-.173	-.159	-.095	-.017	.062	92	-.321	-.218	-.062	.067	.325
26	----	----	----	----	----	59	.169	-.050	-.316	-.483	-.590	93	-.307	-.236	-.087	.138	.304
27	----	----	----	----	----	60	.025	-.151	-.369	-.511	-.592	94	-.267	-.229	-.086	.073	.193
28	-.260	-.296	-.337	-.408	-.412	61	.006	-.114	-.316	-.468	-.561	95	-.284	-.212	-.136	-.044	.032
29	-.313	-.227	-.019	.214	.443	62	.008	-.093	-.314	-.462	-.559	96	-.266	-.208	-.135	-.042	.032
30	-.345	-.353	-.239	-.036	.190	63	-.008	-.093	-.180	-.418	-.528	97	-.235	-.190	-.131	-.045	.031
31	-.235	-.089	-.030	.062	.171	64	-.042	-.102	-.178	-.348	-.467	98	-.216	-.189	-.134	-.062	.006
32	.230	.283	.327	.361	.397	65	-.095	-.142	-.218	-.322	-.457						
33	-.348	-.303	-.207	-.052	.134	66	-.114	-.158	-.228	-.301	-.418						

TABLE IV.- CONCLUDED
(f) Model with rocket packets, M = 1.7

Orifice No.	Angle of attack					Orifice No.	Angle of attack					Orifice No.	Angle of attack				
	-3°	0°	4°	8°	12°		-3°	0°	4°	8°	12°		-3°	0°	4°	8°	12°
0	1.573	1.584	1.566	1.578	1.535	33	-.141	-.150	-.115	-.045	.056	65	-.033	-.081	-.168	-.238	-.292
1	----	----	----	----	----	34	----	----	----	----	----	66	-.048	-.084	-.175	-.221	-.276
2	.506	.433	.338	.255	.175	34A	-.026	-.018	.017	.162	.249	67	----	----	----	----	----
3	.420	.351	.263	.190	.119	35	.046	-.029	.049	.166	.271	68	-.063	-.103	-.186	-.219	-.265
4	.489	.413	.314	.241	.172	36	-.039	-.021	.045	.114	.201	69	.019	-.069	-.121	-.163	-.203
5	.633	.556	.454	.367	.285	37	-.171	-.166	-.114	-.044	.060	70	----	----	----	----	----
6	.195	.141	.074	.021	-.030	38	-.183	-.186	-.155	-.101	-.038	71	----	----	----	----	----
7	-.117	-.152	-.186	-.218	-.236	39	.176	.086	-.029	-.139	-.233	72	-.146	-.146	-.059	.115	.275
8	-.062	-.105	-.087	-.030	.006	40	.036	-.032	-.119	-.193	-.262	73	-.215	-.151	-.003	.094	.238
9	----	----	----	----	----	41	-.014	-.089	-.165	-.238	-.294	74	----	----	----	----	----
10	.056	.038	.017	-.023	-.079	42	.028	-.073	-.167	-.245	-.310	75	-.107	-.084	-.015	.072	.193
11	----	----	----	----	----	43	.050	-.008	-.128	-.220	-.290	76	-.117	-.117	-.057	.054	.141
12	.208	.258	.360	.467	.470	44	-.023	-.069	-.115	-.162	-.269	77	-.138	-.137	-.051	.030	.112
13	.017	.047	.111	.191	.246	45	-.026	-.077	-.125	-.163	-.246	78	-.114	-.098	-.015	.058	.144
14	.004	0	.072	.140	.227	46	-.020	-.064	-.112	-.150	-.201	79	-.136	-.120	-.066	.003	.089
15	.193	.124	.170	.173	.189	47	----	----	----	----	----	80	-.137	-.123	-.078	-.003	.086
16	-.040	-.026	.044	.115	.204	48	-.014	-.063	-.113	-.148	-.181	81	.247	.133	.004	-.156	-.254
17	.723	.636	.488	.391	.222	49	-.029	.009	.157	.365	.490	82	.057	-.023	-.102	-.220	-.292
18	.199	.128	.046	-.046	-.128	50	----	----	----	----	----	83	.003	-.076	-.168	-.247	-.312
19	----	----	----	----	----	51	----	----	----	----	----	84	-.002	-.084	-.170	-.252	-.312
20	-.090	-.146	-.182	-.229	-.269	52	-.006	.026	.090	.213	.383	85	.015	-.083	-.164	-.232	-.295
21	-.026	-.105	-.149	-.210	-.254	53	-.212	-.185	-.105	-.003	.093	86	-.028	-.082	-.181	-.256	-.302
22	.075	.035	-.016	-.071	-.151	54	-.091	-.052	-.016	.081	.175	87	-.069	-.120	-.206	-.276	-.329
23	.054	.005	-.059	-.089	-.135	55	-.098	-.092	-.030	.045	.143	88	-.088	-.123	-.207	-.277	-.330
24	.053	.010	-.059	-.089	-.131	56	----	----	----	----	----	89	-.089	-.124	-.198	-.267	-.296
25	.036	-.008	-.059	-.107	-.144	57	-.010	-.045	-.025	.027	.103	90	.005	.079	.212	.328	.458
26	----	----	----	----	----	58	-.114	-.105	-.049	.026	.113	91	-.100	-.083	.020	.164	.318
27	----	----	----	----	----	59	.221	.115	-.035	-.175	-.270	92	.159	-.133	.006	.128	.285
28	-.113	-.148	-.168	-.215	-.249	60	.062	-.027	-.126	-.223	-.299	93	-.166	-.119	.012	.108	.247
29	-.027	.060	.237	.376	.640	61	-.005	-.077	-.163	-.241	-.301	94	-.100	-.107	-.052	.051	.187
30	-.081	-.097	.046	.080	.274	62	.004	-.081	-.178	-.249	-.303	95	-.155	-.143	-.080	-.011	.089
31	-.146	-.113	.046	.077	.154	63	.023	-.071	-.172	-.253	-.313	96	-.165	-.146	-.086	-.048	.108
32	-.008	-.007	.096	.346	.490	64	.008	-.056	-.155	-.238	-.293	97	-.156	-.143	-.098	.011	.073
												98	-.155	-.148	-.106	-.029	.051

Outboard rocket packet

External fuel tank

Inboard rocket packet

16.56

Wing area, 1.682 square feet

All dimensions shown in inches
unless otherwise noted

4.51

$\bar{c} = 12.04$

6.04   5.88

52.5°

Theoretical
wing tip

External fuel tank and rocket packets on
left wing omitted for clarity

5.50

2.07

56.5°

Rudder faired into fuselage
when canopy removed

6.60

1.76

5.00

6.60

7.61

22.11

26.02

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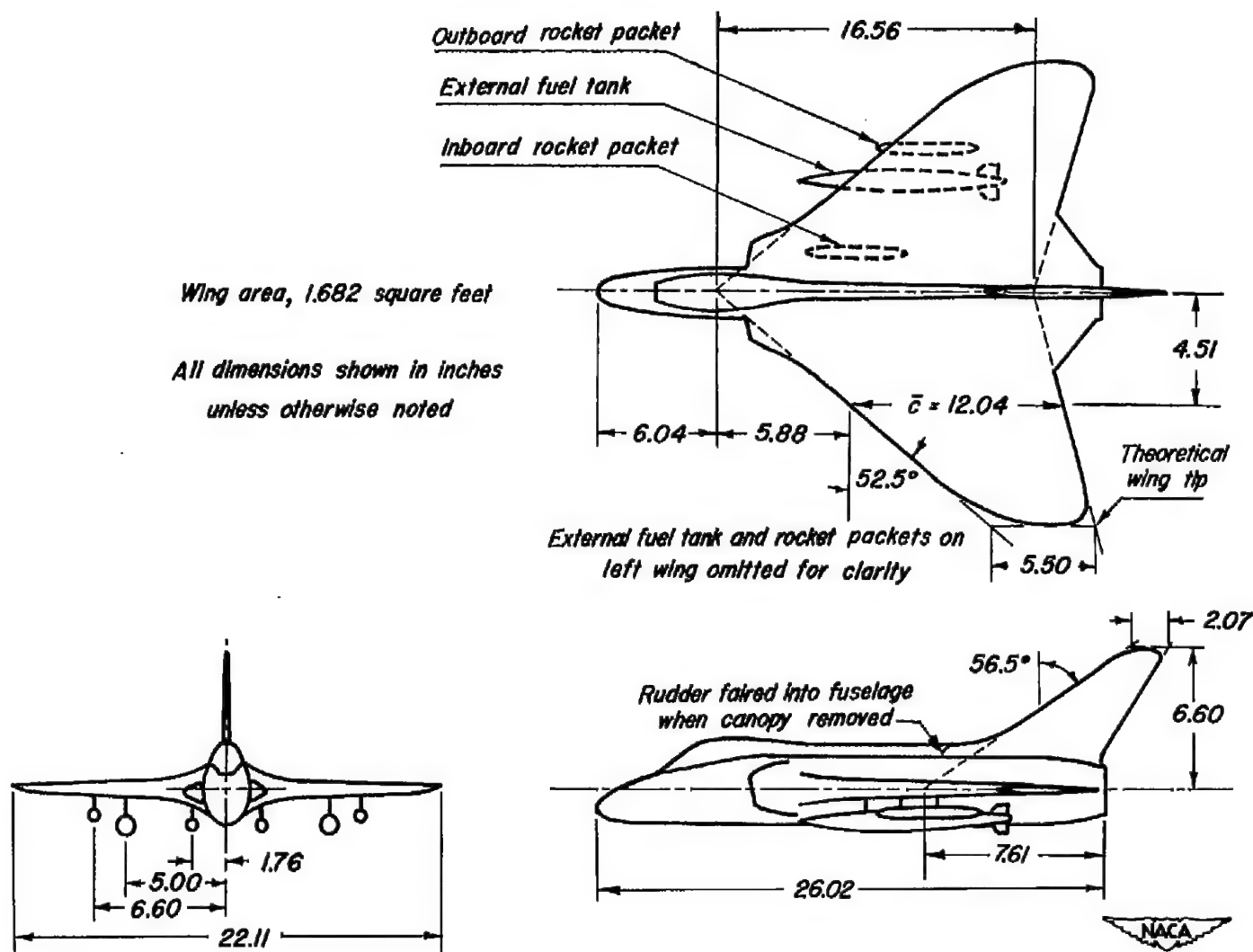
Figure 1.– Three-view drawing of the model showing the external fuel tanks and rocket packets.
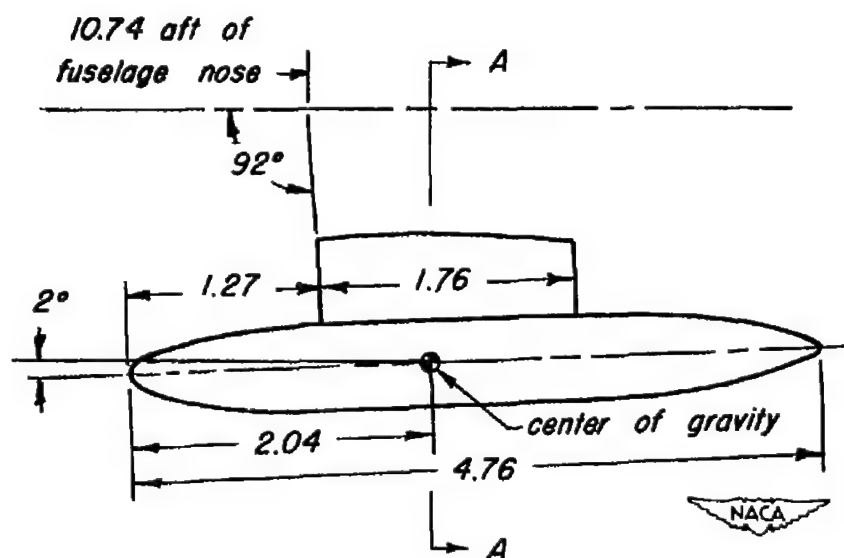
Unswept pylon

FIN DETAIL

Swept pylon

All dimensions shown in inches
unless otherwise noted
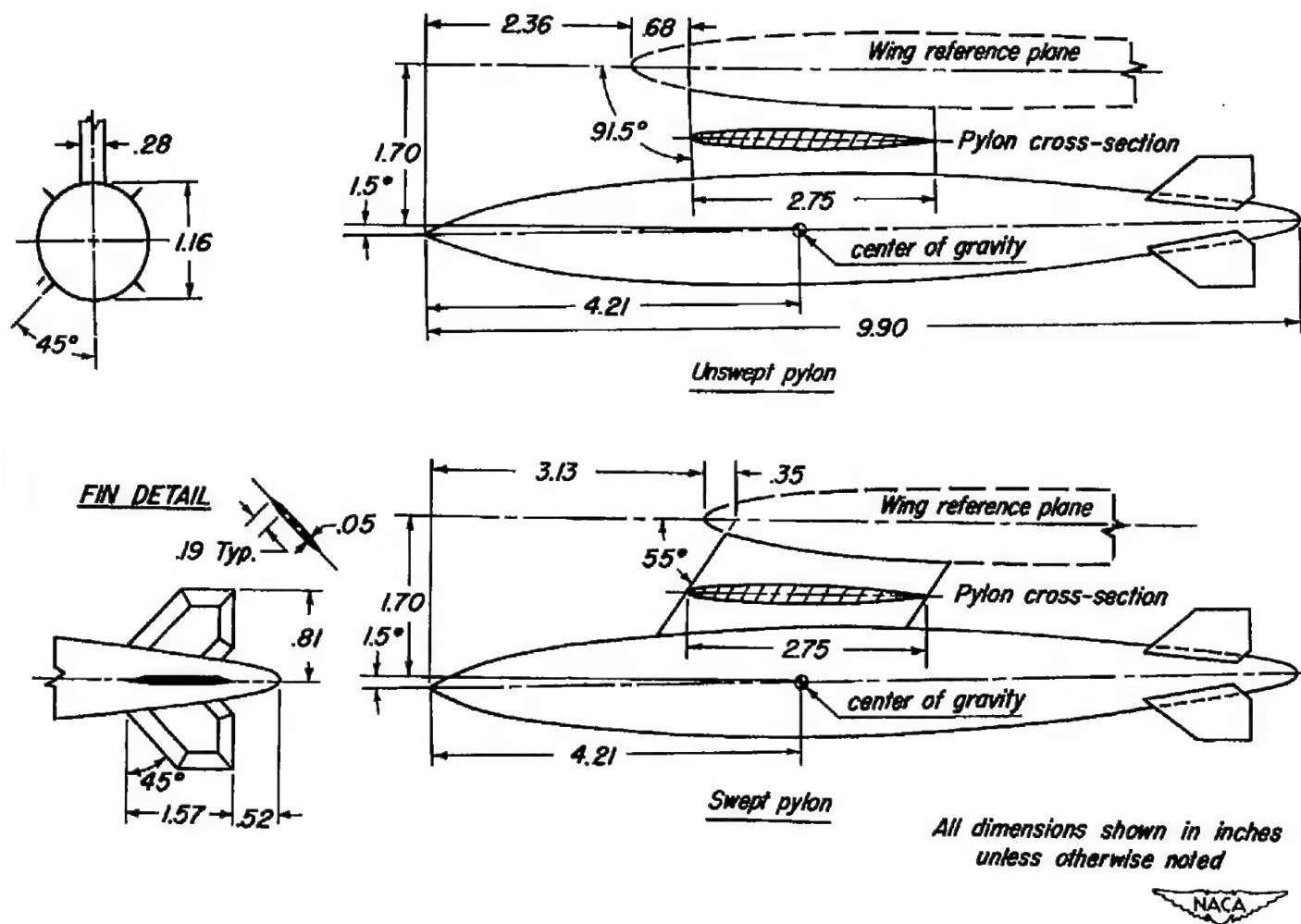
Figure 2.-Details of the external fuel tanks with unswept and swept pylons.

.54   .72

Wing
reference plane

.10

92°

1.76

2°

1.14

.57

2.04

.15 D   on .35 D   circle
typical

center of gravity

4.76

Note: rocket   packet   shown
with open tubes

Unswept pylon

1.30   .27

Wing
reference plane

55°

Pylon cross-sectio
typical

1.14

1.76

2°

2.04

center of gravity

All dimensions   shown in inches
unless otherwise   noted

Swept pylon

(a)   Outboard   location.

Figure 3.— Details of the rocket packets with unswept and swept pylons.

Model plane of symmetry

Wing reference plane

fuselage contour

1.65

1.76

Section A-A

All dimensions shown in inches unless otherwise noted

10.74 aft of fuselage nose

A

92°

1.27

1.76

2°

2.04

center of gravity

4.76

NACA

A

(b) Inboard location.

Figure 3. — Concluded.
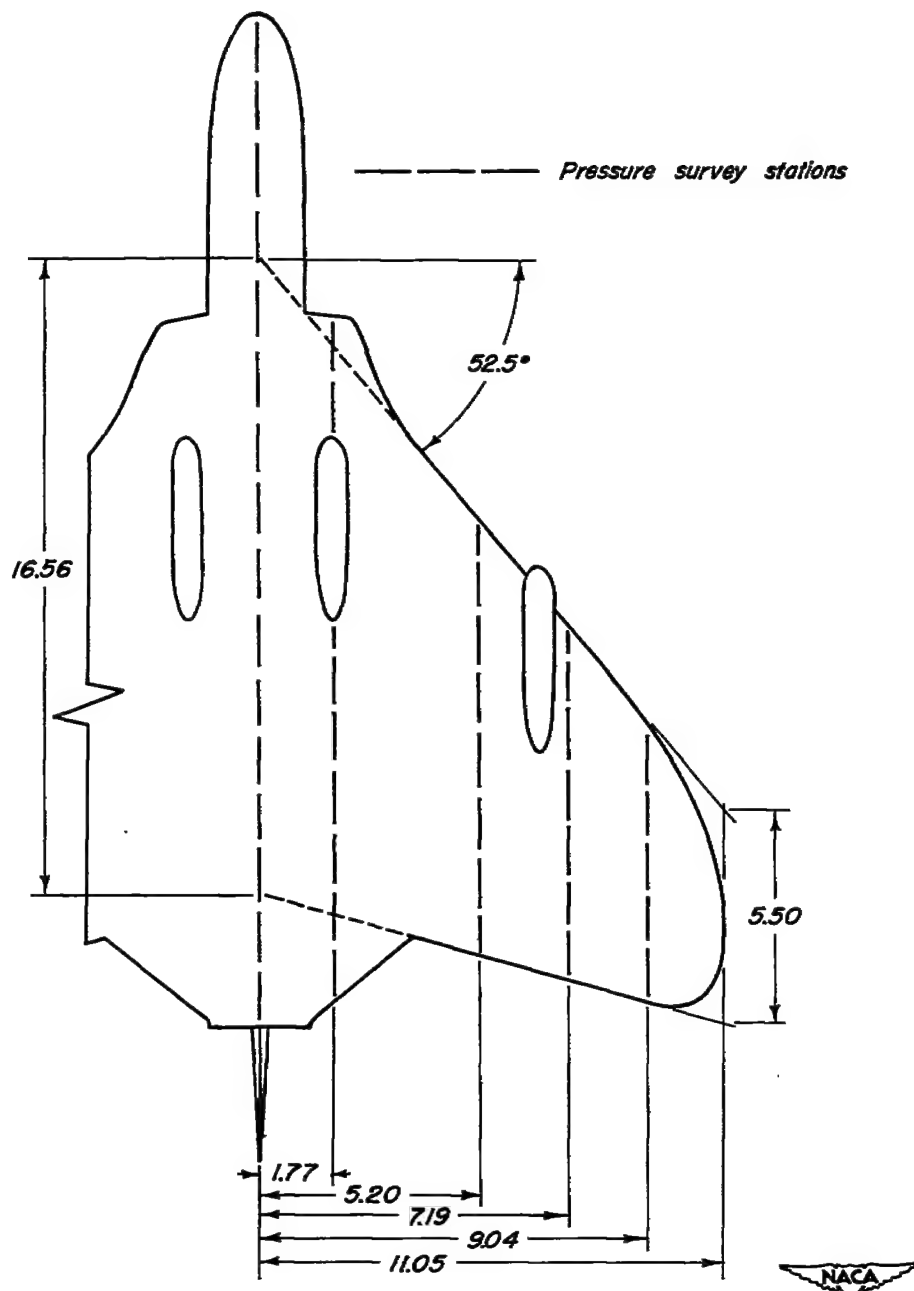
Figure 4.— Dimensionl sketch of the lower surface of the model
with rocket packets installed, showing the pressure
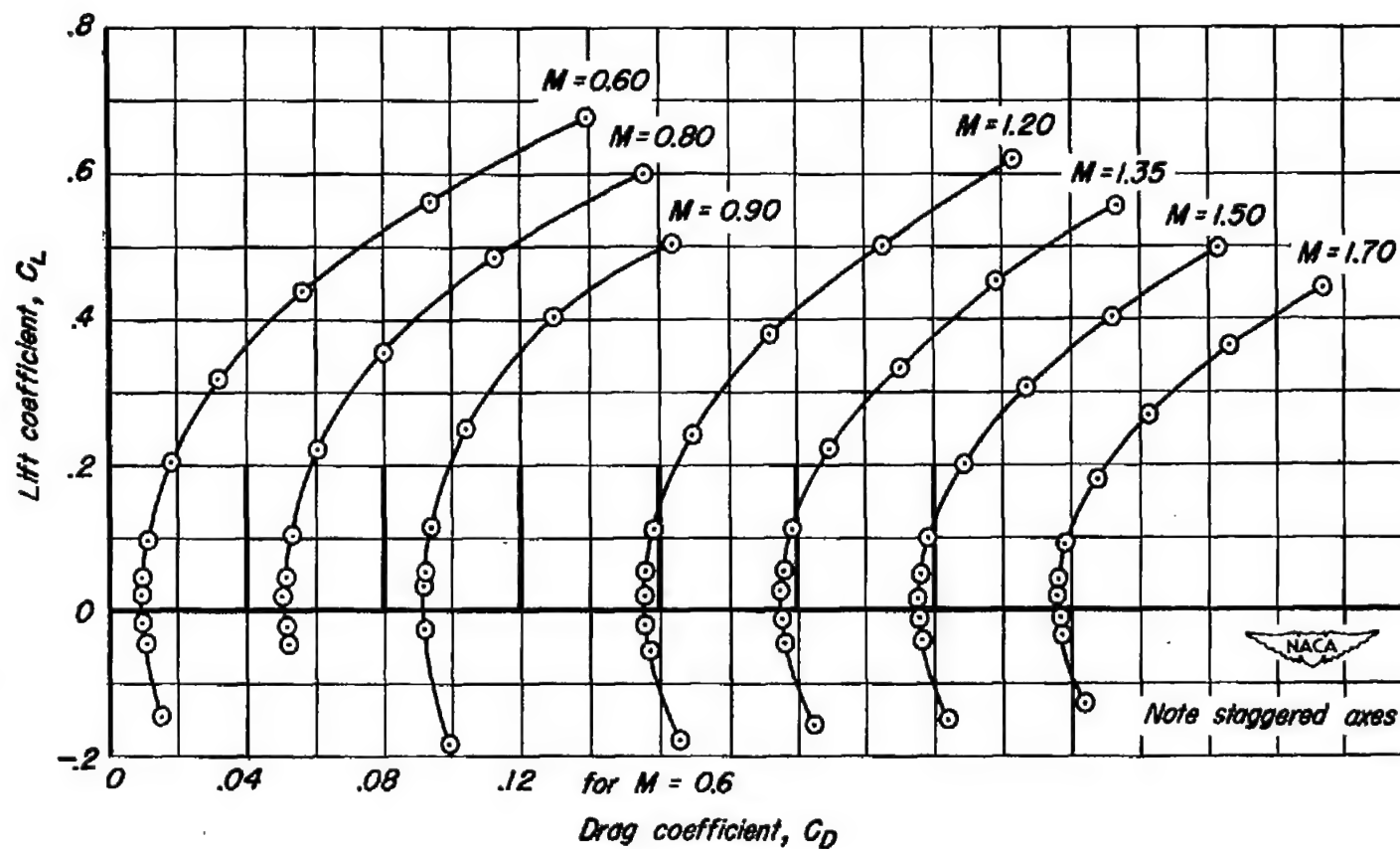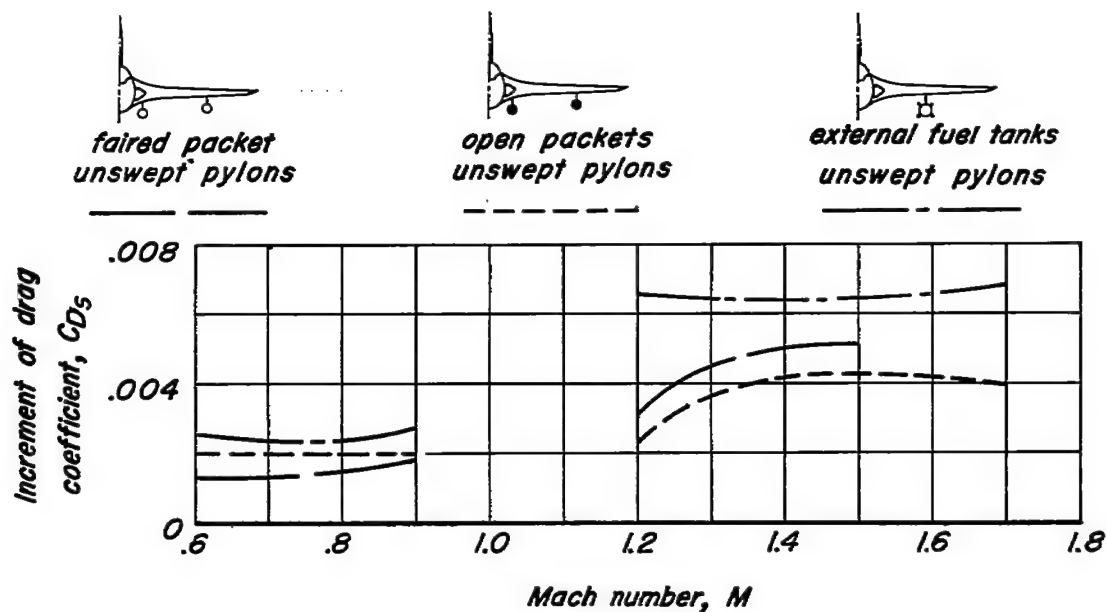survey station.

Figure 5.- Variation of drag coefficient with lift coefficient for the basic model.

faired packet
unswept pylons

open packets
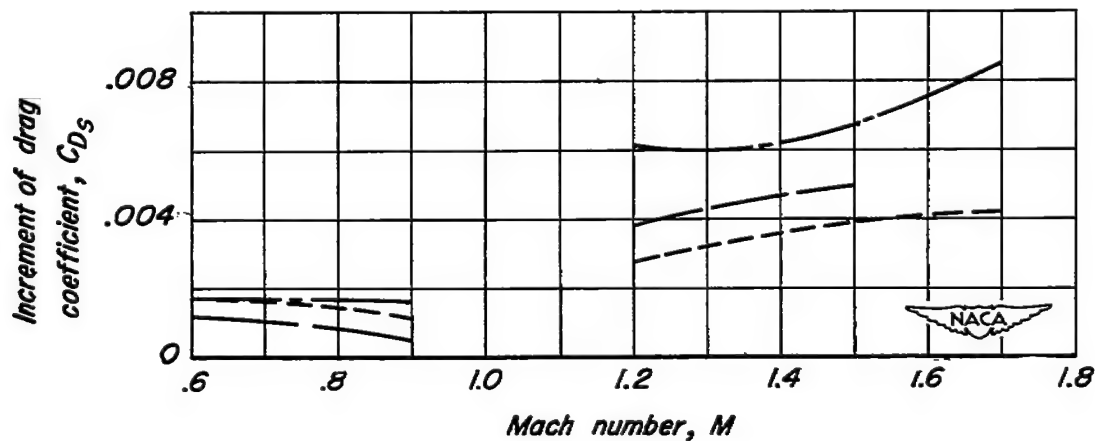unswept pylons

external fuel tanks
unswept pylons

(a) $C_L = 0$

(b) $C_L = 0.25$

Figure 6.- Variation of increment of drag coefficient with Mach number
at 0 and 0.25 lift coefficient for the various external store
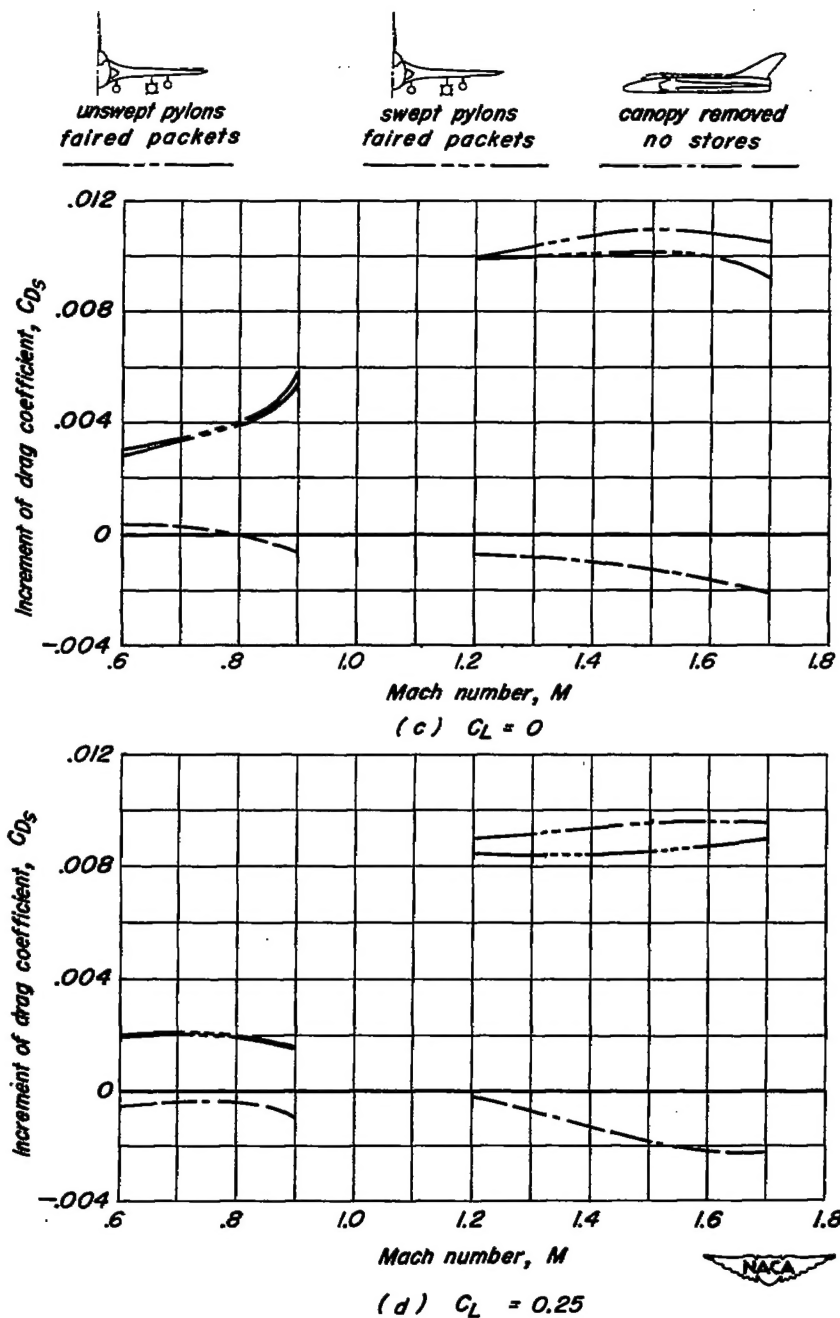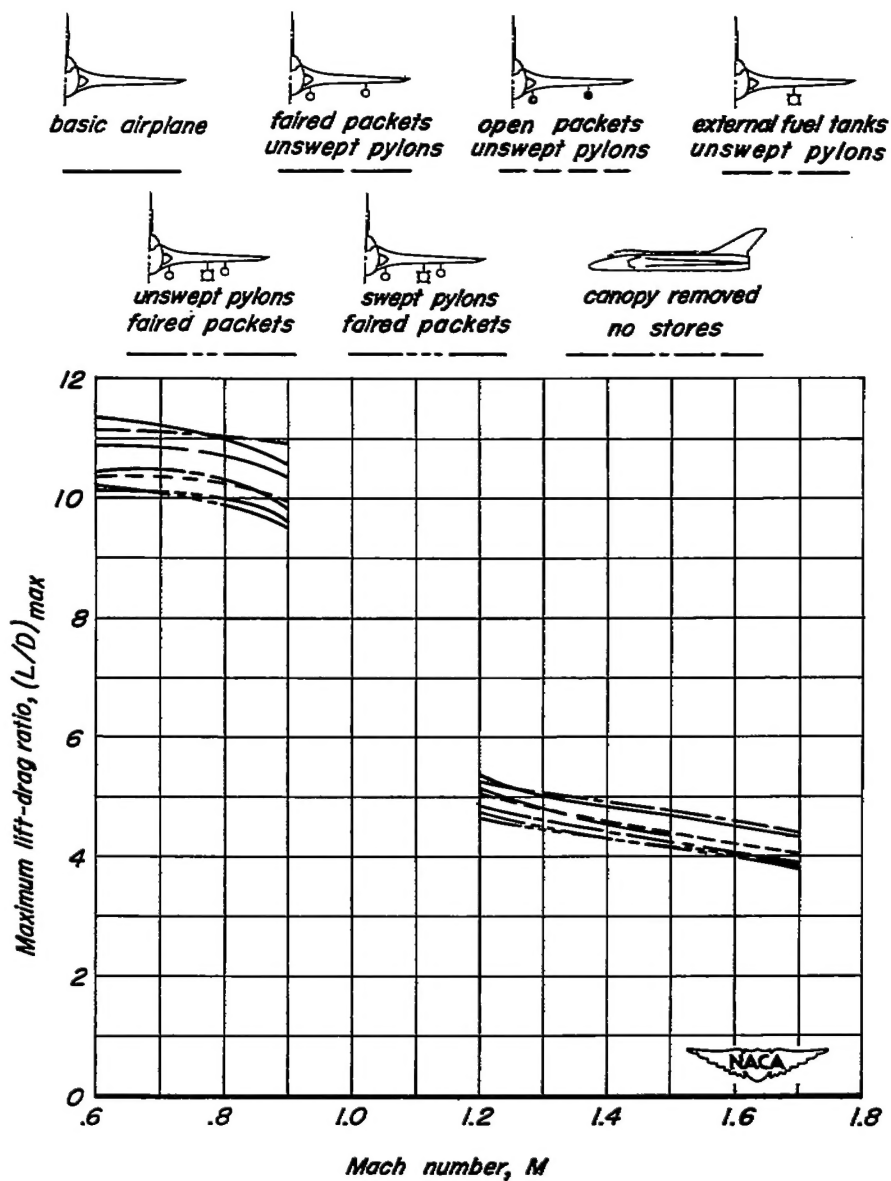configurations mounted on the model.

unswept pylons   swept pylons   canopy removed
faired packets   faired packets   no stores

(c) $C_L = 0$

(d) $C_L = 0.25$

Figure 6 .— Concluded.

basic airplane

faired packets
unswept pylons

open packets
unswept pylons

external fuel tanks
unswept pylons

unswept pylons
faired packets

swept pylons
faired packets

canopy removed
no stores

Figure 7.- Variation of the maximum lift-drag ratio with Mach
number for the various external store configurations
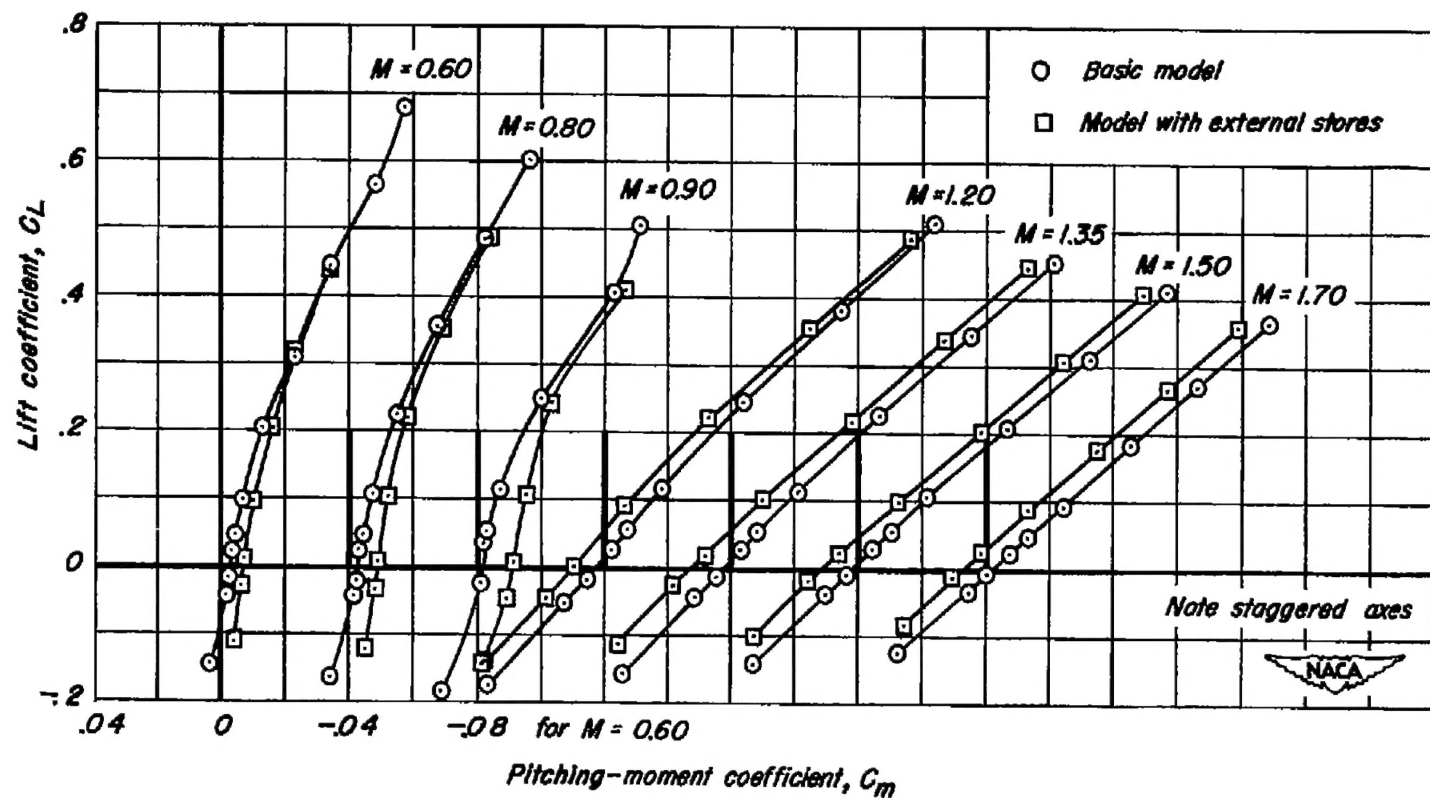mounted on the model.

Figure 8.—Variation of pitching-moment coefficient with lift coefficient for the basic model and for the model fitted with two external fuel tanks and four faired rocket packets mounted on unswept pylons.